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A Review of the Molluscacide Trials Conducted in the Orient Under the Auspices of the U. S. Army

By

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INTRODUCTION

As a result of infections with *Schistosoma japonicum* in troops during and shortly after landing operations in Leyte in 1944, the Army Epidemiological Board organized the Commission on Schistosomiasis. This small group spent six months in the Philippines and two months in Japan during 1945. A review of control measures used for snail-borne diseases led to the conclusion that the elimination of the snail intermediate hosts was the best method of attack, especially if control was to be attained quickly when large groups of susceptible persons were introduced into hyperendemic areas.

Previously thre chemicals had been used as molluscacides in schistosomiasis areas, including copper sulfate and copper carbonate against *Bulinus* and *Biomphalaria,* and calcium cyanamide against the amphibious *Oncomelania.* Under the circumstances found in the Philippines it was apparent that more effective molluscacides would be required if schistosomiasis transmission was to be prevented. For this reason, the testing of molluscacides was included as a part of the work done by the Commission. Later this was greatly extended by members of the staff of the 406th Medical General Laboratory in Japan and as the result of a research grant for molluscacide screening from Army Research and Development Board. The results of this work have been summarized in the present paper under the headings: (1) laboratory screening tests; (2) field plot tests; (3) experimental field trials; and (4) resistance to molluscacides. This review has been made because the World Health Organization has stimulated a revival of interest in the development of new molluscacides and the improvement of various methods of snail control.

LABORATORY SCREENING TESTS

There was no experimental precedent for either laboratory or field evaluations of molluscacides for use against *Oncomelania quadrasi* when the Commission on Schistosomiasis began its work in the Philippines. Furthermore, there was little interest on the part of chemical companies in identifying or formulating molluscacidal agents. Consequently, only 19 selected compounds and mixtures were tested and because of difficulties encountered in devising a suitable laboratory test for the Philippine snail, reliance was placed on results obtained in small field

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plots. The initial investigations revealed that dinitro-o-cyclohexylphenol (DNCHP), or 2-cyclohexyl-4,6-dinitrophenol, and its dicyclohexylamine salt were markedly superior to copper sulfate (McMullen and Graham[1]).

During the period of 1947-49, when the molluscacide testing program was started again in Japan by members of the staff of the 406th Medical General Laboratory, 44 compounds were tested. Sodium pentachlorophenate (NaPCP) proved to be second only in effectiveness to DNCHP in the laboratory and in the field (Ann. Rep. 406th MGL[2]; McMullen et al[3,4]). It was during this period that the plate test (McMullen[5]) was devised for use in determining molluscacidal activity in tests against the amphibious snail, *O. nosophora*. The plan of this test was prompted by the observation that the snail would feed and live for at least five months in a Petri dish lined with moist filter paper. The method that evolved consisted of applying 2 ml of the concentration to be tested on a single sheet of filter paper in the bottom of a 150 mm Petri dish. This was allowed to dry because in many cases the solvents were toxic. When the plates were to be used, 3 ml of water were added to the paper and 10 active, freshly collected, mature snails were placed in the center. During the first day of exposure the plates were examined three times and snail reactions were noted. At each examination the snails were centered, if they had moved from their original location, and water was added as needed. This also was done once during the second and third days of exposure. On the fourth day the snails were washed and placed in clean water in the lid of the dish. All inactive snails were crushed to determine whether they had been killed. A group of compounds that had given different levels of molluscacidal activity in field plot tests was evaluated with the plate test. Typical toxocological curves were obtained with graded concentrations of the compounds, and it was found that all which gave an LC_{50} of more than 50 ppm could have been eliminated from field tests.

The plate technique was then adapted for a full-scale laboratory molluscacide screening program during the summer and autumn of 1950 and 1951 (McMullen[6,7]). At the instigation of Dr. Sterling Brackett, mixed samples containing approximately 0.5 mg of ten compounds each were prepared. The 413 mixtures contained practically all of the solids in the chemical files of the American Cyanamide Company. In testing these mixtures two plates were used, each with 2 ml of a 100 ppm solution. Thirty-three of the mixtures showed molluscacidal activity and tests were made on the 330 separate compounds. This procedure eliminated 3,800 compounds from the tests. Of the 330 separate compounds tested, 66 were slightly to moderately molluscacidal, but 11 mixtures did not contain active compounds after separation.

From other sources 1,675 single compounds were obtained for testing. Many of these had been selected for various reasons and were in a somewhat different category from the "off the shelf" group mentioned above. At this stage it appeared to be important to find out what *types* of compounds were molluscacidal, as well as to determine the most effective ones. For this reason single plates with concentrations of 100, 500, and 1000 ppm were used for each compound. With active compounds additional plates and dilutions were used as indicated and the LC_{50} was determined. In the group of single compounds, 18 were active at concentrations of 20 ppm or less; 36 were active between 20 and 40 ppm; and 77 were active between 50 and 165 ppm.

Twenty selected mixtures of two compounds each were prepared and tested in the plates. Five of these had an LC_{50} of less than 10 ppm and less than the individual compounds in the mixture. It had been observed that some of the organic phosphates, carbamates, and certain other compounds produced a characteristic extension of the body of the snail and some of them were molluscacidal. A mixture of DNCHP and tetraisopropyl monothionopyrophosphate gave the

lowest concentration-toxicity ratio in the laboratory and field tests. While no "miracle molluscacide" was found, either as a single compound or as a mixture, it was evident that most of the active compounds were dinitroalkyl or halogenated phenols.

By means of the plate test, Hunter et al[8] screened 137 chemicals, of which six showed good molluscacidal activity with LC_{50}s between 20-50 ppm. Included among the effective compounds were 2,4,5-trichlorophenol and its sodium salt (Dowcide B), 2,4,6-trichlorophenol, p-tert-butylphenol, 2-chloro-6-phenyl phenol and sodium pentachlorophenate (Dowcide G). Copper pentachlorophenate was slightly less active but this compound may not have been adequately tested against *O. nosophora,* because of its very low solubility.

A group of 236 additional formulations or compounds were tested at the 406th Med. Gen. Lab. by the plate test during 1952-1953 (Ann. Rep. 406th MGL[9]). Among these were 19 chemicals with an LC_{50} of 50 ppm or less. Some of these had been tested previously but a majority were new.

As the testing program continued it became apparent that for precise evaluations of toxicity there were certain inherent limitations in the plate test, which could be overcome by the use of an immersion technique, similar to that used for the aquatic intermediate hosts of the human schistosomes. An immersion test was developed by Moon et al[10] and a comparison was made with the plate test. Stock solutions of 0.1 gm in 100 ml of either acetone (later evaporated) or water were used to prepare two-fold serial dilutions of 1.25 to 10 ppm in 20 ml vials. Six-hour exposures of snails in lots of 10 per dilution were followed by a 66-hour recovery period in fresh water, after which the inactive snails were crushed to determine viability. The LC_{50} was determined for 89 chemicals by the immersion tests, of which 75 also were tested by plate. There were 24 compounds with an LC_{50} of 5 ppm or less by immersion and 100 ppm or less by plate test. Four of the chemicals had an LC_{50} lower than the control molluscacides (DNCHP and NaPCP), but three of these had previously proven inferior in the field. In the immersion test the LC_{50} ratio between DNCHP and NaPCP was 1:1, while in the plate test it was 4:1.

The authors concluded that: 1) the immersion test gave more reproducible results; 2) ingestion of filter paper and chemical by the snails in the plate was an uncontrollable variable which requires separate evaluation; 3) varied activities by the snails on the filter paper, either by retracting into the shell or moving to the lid, could account for a bias; and 4) the use of the immersion test allows comparison with results obtained from experiments with the aquatic snails.

During the period from 1945 to 1955 a total of 6,350 screening tests on *Oncomelania* spp. were made, using single compounds and mixtures. The actual total of the number of compounds tested was slightly less, because of some duplication by the various groups involved.

Field Plot Tests

Since *O. quadrasi* did not adapt readily to laboratory conditions, immersion and simulated-habitat experiments in the laboratory gave poor correlations with results obtained in field plots. For this reason laboratory tests were dropped and the initial evaluations of molluscacides in the Orient were carried out in field test plots. These plots consisted of 25 ft^2 of typical marshy habitat with at least 50 snails per ft^2. Pretreatment counts were made on all living and dead snails found on a ft^2 of the soil, which was removed from the plot for counting. Similar samples were taken on the second, fourth and eighth days after application of the compounds. Copper sulfate was used for comparison with the molluscacidal activity of 18 additional compounds. Eight of these showed some molluscacidal activity but only DNCHP and its dicyclohexylamine salt were markedly better than copper sulfate. It required only about 1/6 as much of these compounds to obtain effective snail control. Logistically

this was important but the two phenol compounds were not yet in full commercial production, they were expensive, and the 87 lbs. per acre that appeared necessary in the *O. quadrasi* habitats did not encourage the idea of aerial dusting or spraying (McMullen and Graham[1]).

During the initial phase of molluscacide testing at the 406th Medical General Laboratory, mentioned in the previous section, it was found that DNCHP, its dicyclohexylamine salt, NaPCP, pentachlorophenol, sodium dinitro-o-cresol, and calcium cyanamide were effective in field test plots (Ann. Rep. 406th MGL[2]; McMullen et al[3,4]). The last compound had been used in Japan as a molluscacide for a number of years but in these experiments it was found that much larger amounts were required than for the other compounds. The field test plots used in these tests consisted of 25-ft lengths of irrigation ditches about 3 ft wide and 2 ft deep, which were heavily populated with *O. nosophora*. Before the application of the chemicals, all of the snails in three 1-ft^2 quadrats were counted and tested for viability. Post-treatment counts were made in similar quadrats on the second, fourth and eighth days.

Field plot tests by Hunter et al[8] involved 9 compounds. These tests were performed in a marshy river bottom in the Kyushu endemic center. The plots were 9 ft^2 and post-treatment observations were made on the third and fourteenth days. Pre- and post-treatment control collections were made in adjacent plots where molluscacides had not been used. In most cases one or two concentrations were used for each chemical. During these experiments it was discovered that a minimum of 100 ml of water per ft^2 was required for the proper dispersal of the chemicals. The four chemicals giving the best results included NaPCP, copper pentachlorophenate, 2,4,6-trichlorophenol, and sodium 2,4,5-trichlorophenate. Combinations of NaPCP with other compounds did not increase its effectiveness.

Following the laboratory screening of 5805 compounds in 1950 and 1951, McMullen[7] tested 22 single chemicals and three double mixtures in field plots, using the sections of ditches and methods mentioned above. Of six compounds with an LC_{50} of over 50 ppm, only one was effective in the field and it was necessary to apply 58 gm to the test area. Of the 11 with an LC_{50} of 20-40 ppm, eight were effective when 5 to 50 gm were used. Five of the six compounds with an LC_{50} of 20 ppm or less were effective when 5 to 20 gm were applied, while for the sixth, 40 ml of the chemical were required. These findings were interpreted as giving relatively good correlations between laboratory and field tests.

Investigators at the 406th Medical General Laboratory continued to carry out field plot tests and introduced a standardized two-fold dilution series of concentrations selected from the range of 0.0125 to 0.8 gm per ft,^{2} depending on the available information on each chemical (Ann. Rep. 406th MGL[11]; Williams et al[12]). This standardization was deemed advisable to assure proper selection of chemical concentrations for field control tests in moist soil habitats, which in Japan must be limited to about a month each in spring and fall when irrigation is not in progress. The most favorable time for field control tests appears to be for about one month during April-May. Approximately 75 series of field plot dilution tests were carried out on 31 different formulations. Numerous long ditches with dense, evenly distributed snail populations were available in the secondary irrigation canals of Yamanashi Prefecture. Since all the ditches had a common water source, they were uniformly wet or dry at any given time. Excessive vegetation was cleared and 25-ft sections (approximately 100 ft^2) were staked and retainer dams were prepared. Pre-treatment mortalities were determined from random collections of 100 snails throughout the length of each ditch sector. Chemicals were weighed in the laboratory in the quantities required for the two-fold series and taken to the field in screw-capped bottles. Each compound was

dispensed with water at the rate of 200 ml per ft² by means of an ordinary garden sprinkler. Post-treatment collections similar to those mentioned above were made at 4 and 14 days after the application.

Among the dinitroalkyl compounds evaluated, dinitro-o-sec-butylphenol, dinitro-o-sec-amylphenol, dinitro-isopropylphenol, and dinitro-o-cresol were about equally effective and gave mortalities of over 90% at 0.2 gm per ft². The 2,4,5-trichlorophenol tested was effective at 0.1 gm per unit and was superior to its sodium salt by one dilution. Parallel tests with pentachlorophenol and its sodium salt, the latter in the form of Santobrite (Monsanto) and Dowcide G (Dow), were about equally effective. Both NaPCP and DNCHP were always used as controls for each series of tests. Against *O. nosophora* in these habitats it required 0.1 or 0.2 gm per ft² of DNCHP, while it required about four times this amount of NaPCP. However, the greater efficiency of the dinitro compound was offset by its greater cost, thus the cost-efficiency ratio for these two compounds was about 1:1, with possibly a slight advantage for NaPCP. When these chemicals are applied by immersion, either in the field or the laboratory (Moon et al[10]), the amount of each chemical required is about the same. This undoubtedly accounts for the selection of NaPCP in many areas as the molluscacide of choice for aquatic snails.

Often the relatively low solubilities of certain compounds tested made it difficult to get proper dispersal in water. In some cases surface acting substances had been added to commercial products, in order to obtain emulsions. Freytag et al[13] (also Ann. Rep. 406th MGL[14]) reported a method for determining the effectiveness of surfactants and tested 22 with seven insoluble phenol derivatives. Molluscicide (0.1 gm) and surfactant (0.5 ml) were mixed and left standing for two hours, and then added to water in a mixing cylinder at the MLC dilution of the compound. The mixture was shaken for 20 seconds and the stability of the dispersion was observed hourly for four hours and after 24 hours. The criteria of evaluation were: (1) complete dispersion; (2) presence of a creamy layer readily dispersible; (3) an oily residue; and (4) a precipitate. All except three of the surfactants were effective on at least one of the insoluble compounds. The following appeared to have the best dispersing properties: alkyl aryl polyglycol ethers (Tergitol NPG); polyethylene glycol 600 and 400; and alkyl aryl polyethylene derivative (Antarox A-400); and a compound whose composition was unknown (Antarox B-201). Tergitol was the most versatile, being able to disperse five of the seven insoluble compounds. The compatibility of four insoluble compounds with surfactants and known effective water-soluble molluscacides was determined. Sodium 2,4,5-trichlorophenate was more compatible than NaPCP in mixture with insoluble compounds and Tergitol.

Experimental Field Trials

Initial population control

The first large-scale experimental control effort sponsored by the U. S. Army was that of McMullen et al[15] in Yamanashi Prefecture, Japan. NaPCP, DNCHP and the dicyclohexylamine salt of the latter were tested in more than 18 miles of ditch, representing a wide variety of habitats. Applications made in the autumn were effective, those made in the spring gave somewhat better results, and a combination of the two was best, with a snail population reduction of 95.4%. The efficiency ratio of NaPCP and DNCHP, based on the amounts required for effective action, was similar to that obtained in the field plot tests, but slightly in favor of the latter. The repopulation potential of surviving snails was noted to be high and it was observed that either excessive or very little rainfall reduced the effectiveness of the application. It was concluded that prolonged use of molluscacides would be required.

Hunter et al[16] extended these observations by means of another field trial with NaPCP in the Kyushu endemic area. Spring and

autumn applications were made for two consecutive years (1950-1951) over 12 miles of irrigation ditches within a 150-acre area associated with Nagatoishi village, which was completely surrounded by dikes. On the basis of snail counts made in 170 1-ft² quadrats, the population reduction was over 98 per cent following three of the four applications, the final reduction being 99 per cent. In spite of these impressive results a repopulation potential was apparent. Since a few snail foci were found, which were heavily treated a fifth time in the spring of 1952 (Ann. Rep. 406th MGL[17]), a report to Japanese authorities stressed the fact that the application of molluscacide would have to continue or repopulation of the entire area probably would occur within a few years. NaPCP was applied diligently for nearly a decade and the results obtained are impressive. In the spring of 1953 only 20 snails were recovered in 48 man-hours of collecting, but after a flood later in the same year, which the dikes failed to hold, the population increased to 13 snails per man-hour. Continued applications reduced the snails to near eradication (Williams, private communication), and this attainment was facilitated by cement-lining of some of the main ditches in the area. While pre- and post-control prevalence data in the human population are not available, it is assumed that this community endeavor probably is representative of the effort required to control schistosomiasis japonica by chemical destruction of the snail host with current methods.

In a continuation of field control tests, four molluscacides were applied annually in April on an irrigated terraced hillside in Yamanashi Prefecture (Ann. Rep. 406th MGL[18]; Moon et al[19]). The compounds tested were NaPCP, DNCHP, 2,4-dinitro-6-sec-butylphenol (Du Pont weed killer), and the sodium salt of 2,4,5-trichlorophenol (Dowcide B). For the first three years the application rates per ft² were NaPCP, 0.4 gm; the two dinitroalkyl compounds, 0.1 gm; and Dowcide B, 0.2 gm. Du Pont weed killer and Dowcide B were dropped in the fourth year, because they proved to be less effective than the other two compounds. These were replaced with NaPCP and DNCHP and at this time the dosages were doubled in all areas. Applications were made in the first year with garden sprinklers, gravity pressure was used to some extent in the second year, and a hand pressure pump thereafter. Pre- and post-treatment population densities were determined on the basis of snails collected per man-hour. This method was feasible, because collections always were made at the same time of year and it was possible to maintain a permanent team of the same expert collectors. It was believed that this procedure afforded better over-all evaluation in test areas than quadrat collecting.

The annual snail mortality rates from 1953 through 1956 for each of the four chemicals were as follows: NaPCP, 95, 95, 71 and 65 per cent; DNCHP, 84, 74, 81 and 93 per cent; Du Pont weed killer, 95, 85 and 77 per cent, and Dowcide B, 84, 29 and 48 per cent. During one or more years each chemical gave inferior results. In spite of poor results obtained during the last two years, NaPCP gave a final population reduction of 91 per cent. Of the four chemicals tested, only DNCHP gave a progressive, cumulative decline in the snail population, the final figure being 99.6 per cent. This was probably linked with the fact that with this compound there was a lower repopulation rate after each application. The NaPCP repopulation percentages were 47, 33 and 48 per cent of the original population, whereas with DNCHP the corresponding figures were only 11, 7 and 10 per cent. This repopulation suppression by DNCHP undoubtedly contributed to the over-all effectiveness of this compound, which was clearly the best of the four tested.

The Japanese did not continue application of molluscacide in this area and it has been indicated by Williams (private communication) that repopulation was rapid after the four-year control period. It appeared that the chemical control of snails on terraced hillsides was handicapped by several factors.

For example, there was no barrier between the base of the terrace and the rice field, into which surviving snails moved freely during the rice-growing season. Then in the autumn, after the rice was cut, some of the snails were apparently buried during the cultivation of the fields, since they could be sieved from the soil in the spring. These snails would be unaffected by spraying the terrace base in April and the fields would have to be flooded with molluscacide to destroy them.

Repopulation control

The concept of repopulation control was stated by Williams et al[20] as follows: "Successful control of *Oncomelania* snails with molluscacidal agents appears to depend on the fulfilment of two distinct requirements: (1) an initial reduction of the adult snail population to the extent that the survivors are essentially isolated; and (2) countering the ability of the snail to repopulate areas despite drastic population reductions." Previously no attempt had been made to kill the progeny of surviving snails until they had reached maturity. The use of ovicides was considered as a repopulation control measure, but the laboratory and field observations of the protective covering of the eggs and the egg-laying sites selected by the female snails indicated that such compounds probably would not be effective. The approach through an attack on the young snails appeared to be more promising. As a result, the possibility of using molluscacides for supplementary repopulation control against the more susceptible juvenile snails was explored (Ann. Rep. 406th MGL[21]; Fonseca[22]; Ritchie[23]; Williams et al[20, 24]).

In Japan most of the hatching of *Oncomelania* eggs occurs only for about three months during the summer. Since the young snails were found to be essentially aquatic for the first few weeks of life and also most vulnerable to poisoning during this stage, it appeared that three molluscacide applications at 3-week intervals might be adequate to suppress repopulation. It was thought that the cost of this method might not be prohibitive, although the volume of irrigation flow would require considerable amounts of the chemical. It also was necessary to consider data which show that the female snail can lay fertile eggs for two years after isolation (Otori et al[25]). Consequently, it was believed that, with this remarkable biological potential, the method of control would have to be continued for at least two years after the population became so sparse that copulation would be precluded.

The areas selected for a test of this method of control had dense populations of snails and NaPCP and DNCHP were applied at concentrations of 5 and 2 ppm, respectively, with exposure period of six hours. Although the chemicals were allowed to flow into rice and vegetable fields there was no harm to the crops. Farmers believed that insect pests were controlled and that DNCHP may have stimulated rice growth. Results on snail control were determined on the basis of the total number and the size-array represented in collections in the spring and summer immediately after each application, at which time irrigation was stopped for 12 hours, and another collection was made in the autumn. The best population samples appeared to be obtained on the basis of snails collected per man-hour.

In certain ditches, or collecting sites, very good results were obtained, with suppression of repopulation and a gradual reduction of the existing adult population. Failures in other sites occurred because the experiment was plagued by the introduction of snails from marginal untreated areas, and inadequate exposures in swampy sites where irrigation flow was slowed down. One test was particularly successful at Kagaminakajo village (Ann. Rep. 406th MGL[26]; Williams, private communication). These results are encouraging because the spraying of only the irrigation ditches is an enormous task and this is greatly reduced when the molluscacide is carried by the irrigation water. Spraying the rice field, where snails are found to a limited degree, appears to be im-

practical. Limitations of the method are apparent and spray application or other methods would be necessary in some habitats.

Resistance to Molluscacides

The possibility of snails acquiring resistance to molluscacides was anticipated but early laboratory experiments were encouraging. Later Okabe et al[27] and Okabe[28] reported that *O. nosophora* in the Kurume area in southern Japan had developed resistance to NaPCP and that this probably accounted for the failure to eradicate the snail by repeated annual applications. In these experiments the LC_{50} of the snails collected in the treated area were compared with those collected in the vicinity of Katayama in central Japan, where this molluscacide had never been used. The two groups of snails were collected and tested at different times of the year. Since it is known that there are temperature and seasonal factors that affect susceptibility, Walton et al[29] determined the LC_{50}s for samples taken from several snail populations and took precautions to eliminate these variables. In the Kofu endemic area snails were collected from an area where NaPCP had been applied two or three times per year, for seven years, and from another area where it had been applied for four years. Collections also were made in an area where DNCHP had been used for six years. Snails from three locations that had never been treated with molluscacides were used as controls for the first compound and from two similar habitats for the second. The collections and the experiments were made in parallel series on the same days and under the same conditions. Previous tests had shown that the LC_{50} for both compounds was about 1.4 ppm by the immersion test (Moon et al[10]). In the tests for the development of resistance, the snails were exposed to concentrations of 1.5 ppm of each compound. The average mortality rates in the snails from the areas treated with NaPCP and those from the control areas, were 33.5 and 31.0, respectively. In the case of DNCHP the average mortality rate was 3.3 in snails from the treated area and 42.8 in those from the control colonies. It was concluded that the marked resistance that had developed might limit the use of DNCHP as a molluscacide against *O. nosophora.*

Discussion

On making comparisons between the above laboratory and field trials, it was concluded that in the former a great deal more than the LC_{50} should be required before considering a compound for field testing (Ritchie[23]). He stated that the following evaluations should be considered before a compound was tested extensively in the field.

"Chemical qualities

1. Residual properties
2. Effect of temperature on toxicities
3. Effect of sunlight and organic materials on chemical stability
4. Increased effects from combination of chemicals

"Effects of chemicals on the snail

1. Additional toxicity tests by both the immersion and plate procedures for amphibious snails
2. Observations on pathological effects
3. Possible accumulation of chemical in snail tissues
4. Suppression of reproduction among snails surviving chemical applications
5. Disproportionate mortalities among infected snails
6. Effect of temperature on susceptibility of snails
7. Relative effects on snails with varying degrees of tissue water-content

"Effects on other organisms as correlated with methods of application

1. Effects of chemicals on crops
2. Effects of chemicals on man and other animals

"A proper sequence of tests might serve to rule out certain chemicals before the entire series was performed, and possibly only 'type' chemicals should be initially tested.

"By reducing the number of agents for field-trials, similar environmental conditions can be assured for a larger proportion of the

total number of compounds to be tested. Replication of the field-trial tests and the inclusion of molluscacides of known effectiveness as controls is imperative. A dilution series of adequate size should be used to reveal mortality patterns or deviations in mortality increments.

"It is imperative that chemicals designated for large-scale field-tests be few in number. Certainly prior to field-tests and possibly before field-trial tests, the criterion of cost and availability should be introduced. Costly chemicals and those not available in a form suitable for application should be relegated to a hold-list. In planning the field tests, consideration should be given to the use of several rather than a single chemical as a means of comparison; in fact two chemicals with a very similar cost-efficiency ratio may require several years of parallel use even in large-scale control to assure fair evaluations of their respective merits."

The points made in the above quotation were reinforced and amplified in the report made by the Scientific Group on Research in Bilharziasis (Molluscacides), convened by WHO in 1959.

In Japan it is becoming more and more difficult to obtain adequate numbers of freshly collected snails for the laboratory testing of molluscacides and the scarcity makes the field testing of promising compounds even less hopeful (Williams, private communication). The rearing of the number of *Oncomelania* required for large-scale laboratory screening would be slow and difficult. For this reason the present authors consider *Australorbis glabratus* as the snail of choice for preliminary molluscacide screening. Active compounds discovered could then be used against *Oncomelania,* using both the immersion and plate tests. The other alternative is to make the preliminary screening tests against other species of *Oncomelania,* in areas where the field supply remains unlimited.

A review of the data indicates that the results from neither the immersion nor the plate test can be completely correlated with those obtained in the field. Of course, the application in the field against *Oncomelania* is usually on moist soil habitats, rather than by immersion. The fact that the amount of water in this habitat varies may account for a part of the difference in mortality rates seen after the application of a molluscacide in the field. There is some evidence for this from observations made with the plate technique. For example, when the amount of water used was varied in the tests with NaPCP it was noted that if the paper was relatively dry the LC_{50} was 125 ppm, but if the paper was wet, so that a film of water was always in contact with the snails, the LC_{50} dropped to 25 ppm (McMullen[6]). Moon et al[10] reported the LC_{50} of DNCHP by the plate method as 8.5 ppm, while McMullen[6] reported 18 ppm. Differences of this magnitude could easily be accounted for by the fact that the temperature was controlled during the former experiments and that the amount of water used on the plates in the two series of tests probably varied.

By using a suitably wetted plate it may be possible to anticipate the rate of chemical application needed for the moist soil habitat. Correspondingly, the immersion test may be expected to show relative values when the compounds are to be applied in water. It is believed that either test can be used for preliminary screening, where a great many compounds are to be tested against *Oncomelania.* It may be that the selection of the method to be used would depend on convenience and whether data from aquatic and amphibious snails should be compared. In any case, the fact remains that the conditions under which the compounds will be used in the field will be quite different from those in the laboratory and it will be necessary to devise modifications of the methods and additional techniques to obtain the data suggested in the above quotation.

During the early phases of the development of the field tests, all of the snails collected from quadrats were used to determine molluscacidal efficiency. As more and more field control tests were made, it be-

came evident that a better method was needed. Under the conditions found in Japan, it appears that the number of snails collected per man-hour gives the best results. In the tests made against juvenile snails, with the application of molluscacide in the irrigation water to prevent repopulation, all of the snails collected were separated into four age groups on the basis of their shell length. In this case the continued absence of young snails indicated that new generations had not been produced. The same would hold true in other areas and the collection of such data should be considered in all snail control programs.

The apparent development of a strain of *O. nosophora* that is resistant to DNCHP is unfortunate. The cost-efficiency ratio of this compound is about the same as that for NaPCP and it is less irritating to handle and gives better residual action.

It has been stated by Alves (personal communication) that *O. quadrasi* in Leyte is highly resistant to NaPCP. Walton has stated (personal communication) that the LC_{50} of NaPCP that had been stored for a year in Japan was much higher than that of a fresh shipment. Previously it had been reported that this compound was quite stable under storage conditions. It is possible that storage under tropical conditions in the Philippines had caused some loss of molluscacidal activity. Questions of this nature, as well as those related to susceptibility and resistance of strains will not be settled until all of the conditions in the experiments are standardized.

Summary

1. During the period from 1945 to 1955, a total of 6,350 primary molluscacide screening tests were made in the Philippines and Japan.

2. Field plot tests were made on all promising compounds and five of the most effective ones were used in full-scale field trials in Japan. The results indicate that DNCHP and NaPCP are the best molluscacides available for use against *Oncomelania* spp. and that the cost-efficiency ratio of the two compounds is about equal.

3. Under ideal conditions in Japan, the application of 0.2 gm of DNCHP or 0.8 gm of NaPCP per ft^2 eliminated most of the snails. The best results were obtained when the chemicals were applied to the moist soil habitat as an aqueous solution at the rate of 200 ml per ft^2. The repopulation potential of the snail is high but one or two applications annually gave excellent control.

4. The introduction of molluscacide into irrigation water at 3-week intervals during the 3-month breeding period of *O. nosophora,* in an attempt to eliminate the susceptible, aquatic young snails, has given encouraging results.

5. There is some evidence that a strain of *O. nosophora* has emerged that is resistant to DNCHP. These snails were found in an area that had been treated with the compound for six years. Resistant strains were not found in areas where NaPCP had been used for 4-7 years.

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OVERSEAS MAIL FOR CHRISTMAS

Christmas parcels for members of the Armed Forces overseas should be mailed early. They should be securely packed in cartons of wood, metal, or double faced corrugated fiberboard. Fragile items must be packed with special care. If in doubt as to items that can be mailed consult your local postmaster. MAIL EARLY.

Cardio-Respiratory Resuscitation for Cardio-Respiratory Arrest

By

CAPTAIN RUDOLPH H. DE JONG, MC, U. S. Army*

(With two illustrations)

THIS paper will stress the necessity for simultaneous cardio-respiratory resuscitation, if cardiac arrest is to be dealt with successfully outside of the Operating Room. It is a plea not to attempt open-chest "cardiac massage," unless another person is present and able to simultaneously administer positive pressure artificial respiration to the patient.

Increasing interest has been displayed in the last decade in the treatment of "cardiac arrest," the sudden, usually unexpected, cessation of circulation due to ineffective or absent contractions of the heart. Originally described as a last heroic resort to reverse cardio-vascular collapse during anesthesia and surgery, it is now gaining acceptance in the salvage of potentially good hearts outside the operating suite.[1]

On the operating table, the patient is constantly observed to detect premonitory changes in the circulation or respiration. Cardiac arrest can be almost instantaneously diagnosed from absence of blood pressure, pulse, respiration and heart sounds, with the additional check of absence of bleeding from the wound. Immediate treatment can be instituted by the surgeon-anesthetist team in attendance.

Even under such optimum conditions, complete recovery from cardiac arrest is at best around fifty percent,[2] while the figure of twenty-five percent recovery[3] may be closer to the national average. Many factors account for this rather poor showing. First of all, the diseased heart will be difficult to restart and once started may not be able to continue and will falter again; cardiac massage in a patient dying from massive myocardial infarction, for example, would be unwise. On the other hand some hearts without pathological changes may suddenly cease to be effective, due to poor oxygenation, drug depression, reflexes or stimuli during surgery, excessive retention of carbon-dioxide, electrolyte changes, blood loss, over-transfusion or electrical shock. Many of these hearts can be restarted, both inside and outside the hospital, if immediately and properly treated. But complete neurological recovery can only be obtained if oxygenated blood reaches the brain within three to four minutes following cessation of circulation.

CARDIAC MASSAGE

Recent studies with dog heart-lung preparations show that manual systole even at optimal rates of massage produces only 26 percent of the expected normal cardiac output.[4] Since oxygen cannnot be stored in blood or tissues, this startlingly low level of effective attainable circulation seems barely adequate to sustain the vital organs and will be totally inadequate if the lungs are not immediately ventilated. Not only is circulating, oxygenated blood the sine qua non for survival, but circulation and ventilation must be effectively maintained to prevent the alarming rise of carbon-dioxide pressure which rapidly follows cessation of respiration. The respiratory acidosis of asphyxia, if not reversed by adequate cardio-respiratory resuscitation, will itself depress the already handicapped heart and make spontaneous heartbeat even more difficult to achieve.

The term "cardiac massage" is widely used to describe intermittent manual compression of the heart in standstill. Although technically a misnomer, since the heart is not "massaged" but rather squeezed or pumped—cardiac massage has become an accepted medical term. But cardiac massage by

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this or any other descriptive name is a potentially dangerous expression, since in many physicians' minds it has become established as the one and only emergency procedure required for treatment of cardiac arrest.

Failure of survival following isolated cardiac massage is then blamed on the procedure itself, rather than on the fact that only one half of the existing cardio-respiratory arrest was treated.

Asphyxia

A human being can tolerate hunger and thirst for several days without permanent ill effects, but he needs air every minute—day and night. The heart may be made to beat again for some time even in the absence of oxygen,[5] but the higher centers of the brain will never again function properly if oxygen-laden blood does not reach them within a few minutes from cessation of circulation and respiration.

Emphasis on the surgical aspects of treatment for cardiac arrest (e.g. thoracotomy and cardiac massage) has overshadowed the important physiological aspect of immediate reestablishment of adequate pulmonary ventilation. Every instance of cardiac arrest is accompanied by an *equally lethal* respiratory arrest—the complete cessation of pulmonary gas exchange with the pulmonary circulation. In fact, respiratory depression with its resultant low oxygen and high carbon-dioxide blood levels—asphyxia—may precede and eventually lead to cardiac arrest.

Cardio-Respiratory Arrest

The term cardio-respiratory arrest is suggested to more adequately and completely describe the clinical conditions encountered in so-called "cardiac arrest." Cardio-respiratory arrest succinctly denotes the cessation of *both* effective circulation and effective respiration and thereby indicates the logical treatment of this emergency—simultaneous restoration of *both* circulation and respiration. Manual systole does effectively reestablish circulation and peripheral pulses may be palpated. But the operator is merely circulating unoxygenated blood through the patient as long as the concomitant respiratory arrest is allowed to continue. Artificial circulation of unoxygenated blood by cardiac massage can *not* restore life, even though a peripheral pulse may be palpable. To salvage and return the vital organs, especially the brain and heart, to normal function, an adequate flow of adequately oxygenated blood must be reestablished within a few minutes from the diagnosis of cardiac arrest.

Artificial Respiration

Methods of artificial respiration, which alternately compress and release the thoracic cage to empty and fill the lungs, will not work adequately in the presence of an open chest and in addition would be obviously impractical while the heart is being pumped. On the other hand, positive pressure artificial respiration is eminently suited to open chest ventilation, removes the assistant from the operative area to the patient's head and in addition allows complete control over the upper airway.

In the operating room, an endotracheal tube or tight fitting mask and breathing bag with a source of oxygen are always at hand, while rescue squads have oxygen apparatus at their disposal. But positive pressure artificial respiration can be instituted anywhere, anytime, by the exhaled air, mouth-to-mouth (or mouth-to-nose) method, which performs well even without instruments or machines.

In studies on paralyzed, apneic volunteers, Elam et al demonstrated that adequate arterial reoxygenation (over 90 percent oxygen saturation) could be consistently obtained within one minute from the start of mouth-to-mouth breathing; while the respiratory acidosis was similarly reversed[6] Safar showed that even untrained volunteers were able to maintain arterial oxygen concentrations between 97 and 100 percent and alveolar carbon-dioxide concentrations

FIG. 1. *Minimum Equipment for Cardio-Respiratory Resuscitation.* The scalpel belongs in the physician's hands; the Safar airway is inserted and used by an assistant under the physician's supervision.

between 4 and 5 percent for at least thirty minutes.[7]

More effective (and more esthetic) exhaled air respiration may be administered with the simple, light, portable and inexpensive Safar double-airway insufflator[8] (Figure 1). The patient-part of this instrument is used as an ordinary pharyngeal airway, eliminating the frequent source of difficulty with obstruction in the upper air passages. The other tube of the instrument serves as a hygienic mouthpiece for the assistant performing exhaled air artificial respiration. This instrument is hollow and thus provides a direct pathway for exhaled air from the rescuer's mouth to the patient's larynx.

EQUIPMENT

Necessary instruments and drugs for cardio-respiratory resuscitation are available in the operating room and best results in cardio-respiratory resuscitation are obtained here. But combined cardio-respiratory resuscitation can be performed elsewhere with only two simple, portable and inexpensive instruments. This extends the usefulness of the procedure beyond the operating room to the entire hospital and emergency ward, the doctor's office and any other place, where a physician witnesses arrest of a potentially salvageable heart. Figure #1 demonstrates these tools—one instrument to one pair of hands. The surgeon's scalpel with attached knife blade is self-explanatory. It serves to open the chest (and if necessary the pericardium) rapidly and cleanly. The scalpel may be autoclaved and stored sterile in a laboratory glass test tube. It is then quickly available for use, can be inspected frequently and is safely kept out of harm's way.

The double airway instrument (Safar resuscitator) makes exhaled air resuscitation simpler and surer and obviates contact with the patient's mouth. The resuscitator may be cold-sterilized in a suitable solution and stored in a-sealed transparent plastic bag.

With this minimum equipment placed in two pairs of hands (Figure 2), emergency cardio-respiratory resuscitation can be instituted instantaneously until further assistance, equipment and drugs arrive or until the patient can be taken to an operating room.

The small and light package of two cheap, easily obtained instruments can be kept in the office, hospital wards, clinics, diagnostic areas and in the emergency room. It may be carried in the physician's bag, in ambulance and rescue trucks. It has a definite place in civilian disaster stock piles because of its compactness, low cost and wide applicability. For the Armed Forces its simplicity, portability and minimal maintenance warrants inclusion in all possible areas of medical need.

TWO PAIR OF HANDS

This phrase serves as a reminder to the physician witnessing a cardiac arrest that cardiac massage by itself and alone is incomplete treatment. To give the patient the full potential of actively resuming normal life, another person—another pair of hands—should be present at the site and be able to institute artificial respiration at the very same time the chest incision is begun. "Two pair of hands" emphasizes that both hands of the physician are occupied with opening

the chest, exposing the heart and intermittently compressing it. Another pair of hands is needed to attend to ventilation of the patient and maintenance of a clear airway.

Closed Chest Resuscitation

Simultaneous cardio-respiratory resuscitation is probably superior to any other method in the treatment of cardiac arrest. But situations frequently arise where this approach is either not feasible or not warranted. There may be no equipment—not even a knife—there may be no assistant to administer artificial respiration; or the patient may be so ill or the heart so damaged as not to justify opening of the chest. Under these circumstances an attempt may be made at striking a firm blow to the precordium of the chest, followed by mouth-to-mouth respiration, another blow to the precordium and return to exhaled air respiration.[9] This method seems especially suited to resuscitation on the medical wards, and for use by laymen; mechanical stimulation of the failing heart and a fresh supply of air to the lungs may be sufficient to start a new series of contractions of the heart.

"Closed-chest cardiac massage" has recently been described in the Journal of the American Medical Association.[10] It also consists of intermittent mechanical stimulation of the heart by pressure on the chestwall; a technique akin to artificial respiration. By this method a limited exchange of air is made possible, as long as the airway is kept patent.

Summary

Despite the presence of a palpable peripheral pulse, circulation of unoxygenated blood by means of cardiac massage, *without concurrent artificial pulmonary ventilation* is doomed to failure. Asphyxia from coexistent respiratory arrest rapidly nullifies any chance at normal survival the patient may have had initially.

The term "cardio-respiratory resuscitation" is suggested to replace cardiac massage, since for successful revival both circulation and ventilation must be simultaneously restored by artificial means. Only then will the basic physiological function of the cardio-respiratory system—to supply oxygen and remove carbon-dioxide be approximated.

Two persons—two pair of hands—are needed for adequate open-chest resuscitation. The physician to intermittently compress the heart (artificial circulation) and an assistant to intermittently inflate the lungs (artificial respiration).

Minimum equipment for maximum effectiveness, consists of a surgeon's scalpel to open the chest and expose the heart and a Safar insufflator for exhaled air artificial respiration.

Two methods for closed-chest cardio-respiratory resuscitation, useful when an assistant is not available or when the severity of preexisting disease does not warrant thoracotomy, are briefly described. These methods may be of practical use in the hands of laymen.

Fig. 2. *Two Pair of Hands.* The physician is fully occupied with the surgical and mechanical aspects of manual systole. While exhaled air respiration fully occupies the assistant. Cardiac massage without simultaneous positive pressure artificial respiration (the second pair of hands) is doomed to failure.

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Abstract

EFFECT OF DOSAGE AND INTERVAL BETWEEN INJECTIONS ON THE ANTIBODY RESPONSE TO POLYVALENT INFLUENZA VACCINE

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(*The Journal of Laboratory and Clinical Medicine*, September, 1961)

Antibody response following different dosages and schedules of administration of influenza vaccine was studied in groups of young airmen. For this purpose a special formula (Commission on Influenza) vaccine containing a total of 500 chicken cell agglutinating (CCA) units per ml was used. This vaccine had been prepared by standard methods and consisted of type A. strains, Swine, PR8, 1957 A1 (A prime), 1957 A2 (Asian), 100 CCA units each, and type B strains, Lee and 1954 B (Great Lakes), 50 CCA units each. (The Swine and Lee viruses have not been included in the current vaccine formula.) All individuals received two subcutaneous injections of 1.0, 0.5 or 0.25 ml separated by intervals of six, eight or ten weeks. Response to vaccination was determined by titrations of hemagglutination-inhibition antibody with all viruses included in the vaccine and with sera obtained before and after each inoculation.

A single dose of 1.0 ml caused an active antibody response to all components except Swine virus, probably because of the lack of previous experience with this agent. These results were reflected in individual as well as group mean titers. Following a second 1.0 ml injection of vaccine mean titer increases were all less than two fold except with the Swine strain, and the results were only slightly enhanced by lengthening the interval between inoculations to 10 weeks. Reduction in size of dose to 0.5 or 0.25 ml resulted in lower mean antibody titers after the first or second injection of vaccine. In general, antibody increments appeared to be proportional to the total amount of vaccine administered, whether it was given as a single or divided dose. Also, fold increases in titer were greater in individuals without much initial antibody, but final titers were lesser in this group.

On the basis of results obtained in this study an advantage was derived by dividing the vaccine dosage in that more antigen could be administered without increasing untoward reactions.

This investigation was conducted under the auspices of the Commission on Influenza, of the Armed Forces Epidemiological Board, and was supported by the Office of the Surgeon General, U. S. Army.

The Shortened Lower Extremity—A Precise Method of Measurement and Its Significance

By

A. W. SCHENKER, M.D.

(With eight illustrations)

BECAUSE the lower extremity is a weight-bearing member, its exact length, within clinical limits, with respect to the other member is a matter of the first importance. For not only is the cosmetic appearance of the gait a powerful factor in the patient's morale but of far greater importance is the pathological impact this may have later on the articulations on that side, and possibly on the opposite side, and especially on the vertebral column. No one will dispute that unless this is properly corrected some such pathological changes are certain to follow in due course and to a varying degree. Similar reasoning applies, of course, to the lower extremity amputee, insofar as the remaining articulations of that extremity are concerned, as well as those of the opposite side and on the vertebral column.

What methods are currently available to enable us to measure its length to an adequate degree of clinical accuracy? What degree of accuracy shall we regard as clinically adequate to correct a defective gait? It is probable that unless the correction is at least of the order of plus or minus ¼ of an inch, the pathological gait due to difference in length of the extremities will not be adequately corrected.

On the other hand, the conventional method most favored of measuring the length of the lower extremity is so hopelessly inaccurate that to depend on it is to perpetuate a fallacy which has no place in the medical armamentarium. No two competent observers measuring the length of the same two extremities may come up with the same answer. Indeed, the same observer measuring the same two extremities at different times may come up with a different answer each time. Moreover, the disparity in measurements between the two extremities may be as great as plus or minus 1″ from one competent observer to another. Whoever has occasion to take and use such measurements will recognize this verity.

Why should there be such great disparity in readings? The answer, of course, must lie in the method of measurement. The method most widely accepted is that of making use of the bony landmarks of the anterior superior iliac spine and the internal malleolus of that side. Contrary to what the name implies, the anterior superior iliac spine is not usually a pointed spike but is more often a blunt, rather wide, rounded projection of bone. Moreover, since it is covered by fat, muscle and skin, its ambiguity as a landmark is further accentuated. All this is on the assumption that there is no anomalous thickening of the bone or that the position of one anterior superior iliac spine is precisely at the same level as that of the opposite side. Naturally if any differences are present, the landmarks are made even further indistinguishable. Thus it is clear that the anterior superior iliac spine is a poor, and therefore undependable, landmark to be used as a base of reference so that a tolerance of plus or minus ½″ must be expected as the minimum variation. Any expectation better than this must be regarded as unrealistic.

In regard to the internal malleous similar reasoning applies. Here we have a coarse, partial spheroid which may have a sporadic flat or pointed overgrowth or other irregularity of surface, any part of which may be used as a landmark. Here, because of its large size, the surface as a landmark is even more ambiguous than that of the anterior superior iliac spine, therefore the error in localization may be expected to be even

bigger than at the anterior superior iliac spine. To offset this some observers prefer to use the inferior border of the malleolus as their point of reference. But this, likewise, may lead to inconsistent readings due to bony irregularity, and the varying thicknesses of soft tissue overlying the inferior border.

Finally, in measuring a length of the order of 30 inches, an error of only 1% will introduce a tolerance of as much as plus or minus 0.3 of an inch. Thus there are at least three different sources of error which, cumulatively, may add up to as much as plus or minus one inch.

There is still a further source of possible error which should be mentioned although its magnitude is not easily demonstrated. This refers to the fact that conventional measurements are usually taken with the patient in the supine position. In this position there is a laxity of capsular and other periarticular ligaments as well as relaxed adjacent muscle groups. It must be assumed that in this position the articular surfaces make very light, if any, contact with their opposing surfaces. However, in the upright position all joints of the lower extremities take the full weight bearing load of the body, that is to say, the opposing articular surfaces are pressed hard against each other thereby providing an apparent bilateral shortening. This shortening may or may not be equal, depending upon possible aberrant differences in length of the long bones which have been otherwise masked.

In the case of the lower extremity prosthesis and especially at the above-knee level we frequently see a deviational gait, the cause of which may be difficult to determine. A well trained amputee with a good fitting prosthesis may nevertheless present a deviational gait. The latter of course could be due to improper length of the prosthesis but there is, at present, no certain way of determining this except by trial and error.

From the foregoing it is clear that the conventional approach to the determination of difference in length between the two lower extremities, by depending upon bony

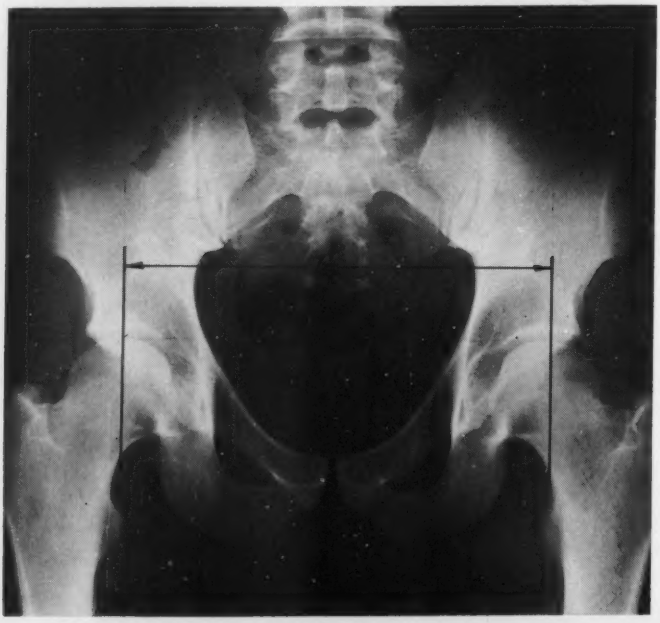

FIG. 1. Normal pelvis.

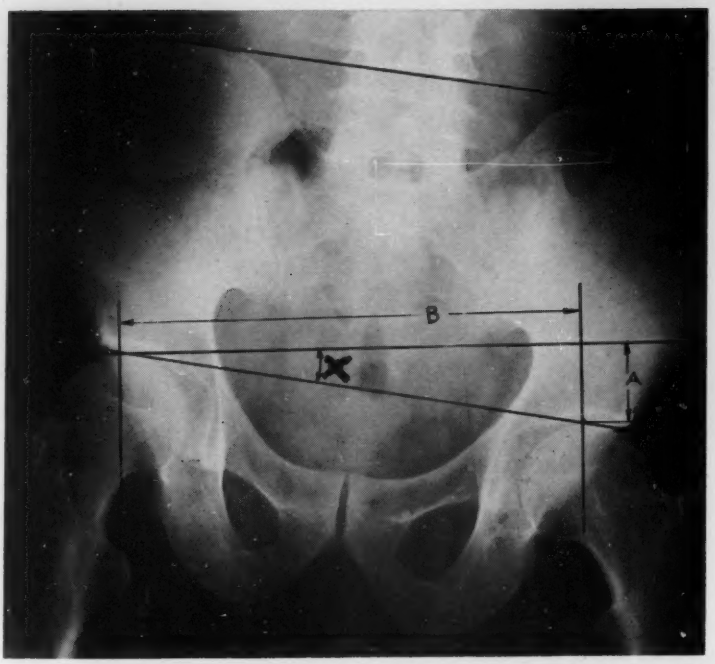

FIG. 2. Diagram showing basis of calculation of shortening due to pelvic tilt of 2°.

landmarks, presents at least three different sources of extrinsic error, the cumulative effect of which is to render prescriptions for shoe rises or prostheses a matter of guesswork, thereby perpetuating a limping gait, however slight, with all its pathological sequelae or of having to go through the necessity of "cutting and trying" until the shoe or prosthesis is of the proper height—whatever it is.

Since bony landmarks as points of reference are too crude and therefore basically unsound, any method of measurement which can bypass these assumes importance. What alternative is there? X-ray techniques are available whereby a high degree of accuracy may be attained. But these are awkward, time consuming and expensive. They also require interpolation because of convergence error.

We know that with one shortened lower extremity the pelvis becomes tilted down to that side. If this tilt can be measured to a high degree of clinical accuracy, then we need only to shim up the shortened extremity to the point where the pelvic tilt returns to zero. The thickness of the shim thus obtained constitutes the increased height necessary to produce the equivalent of equal length of both lower extremities under weight bearing conditions.

With the introduction of the Fluid Dual Goniometer[1] it is now possible to measure the pelvic tilt down to an accuracy of plus or minus two degrees.

The normal stance of the average adult male, as gleaned from a series of x-rays, shows that the distance between the centers of the two femoral heads in the antero-posterior position is of the order of 7½" (Figure 1).

If the angle of the pelvic tilt = X degrees and the shortening of the extremity = A inches, then, $A = 7.5 \tan X$. Now, if $X = 2°$ (upper limit of accuracy of fluid dual goniometer), then $A = 7.5 \tan 2° = 0.262$, say

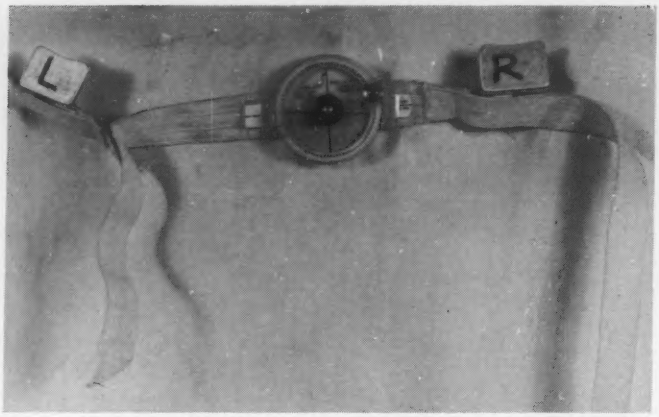

FIG. 3. Fluid dual goniometer in place on elastic belt.

¼" (Figure 2). That is, the accuracy by means of the pelvic tilt method is increased to ± ¼" (cf. conventional method, ±1").

PROCEDURE

The procedure is as follows:

1. Insert fluid dual goniometer into appropriate slips in back of elastic belt with arrow of goniometer back plate extension pointing to the right (Figure 3).

2. Facing back of patient, apply angle clip marked "R" so that its top concave leg rests firmly on the right iliac crest with the concavity against the soft tissues of the abdomen.

3. Direct patient to hold this down securely in place with his right thumb on top leg of clip and with index and middle fingers on side leg of clip (Figure 4).

4. Making certain that the elastic belt is not twisted, place second angle clip marked "L" on left iliac crest with concavity against the soft tissue of the abdomen.

5. Direct patient to hold this down securely in place with his left thumb on top leg of clip and with left middle and index fingers on side leg of clip (Figure 5).

6. Draw elastic strap thru buckle so that it is fairly taut along the back and also making certain that the top margin of the elas-

FIG. 4. Angle clip with its horizontal leg resting securely on right iliac crest.

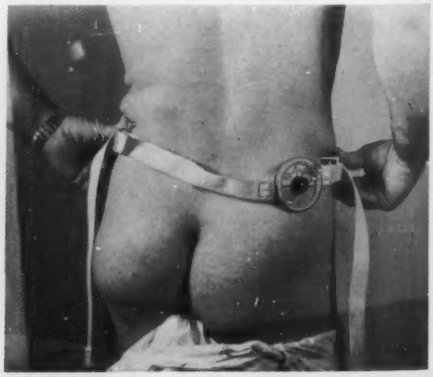

FIG. 5. Angle clips with their top horizontal legs resting securely on both iliac crests.

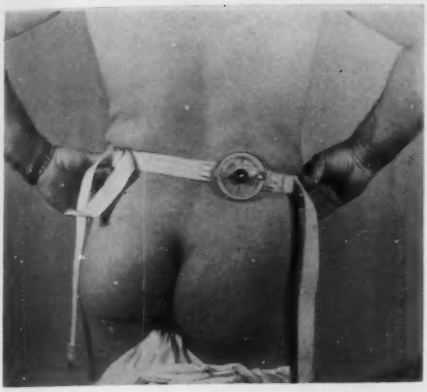

FIG. 6. Elastic strap taut and in straight line between iliac crests.

FIG. 7. Belt fastened in front of abdomen.

tic strap lies in a straight line between the two iliac crests (Figure 6).

7. Fasten belt in front of abdomen until it is quite taut (Figure 7).

8. Direct patient to remove fingers from clips and to stand relaxed with equal pressure on both feet. Facing back of patient, fluid dual goniometer is now ready to be adjusted (Figure 8).

9. Set magnifier at zero on dial and then simultaneously rotate magnifier bar with fluid housing until magnifier hairline is parallel to fluid level. (Maintain eye level so that the line seen thru the magnifier coincides precisely with the zero on the dial.)

10. Move magnifier (making certain it is not engaged with fluid housing) away from zero until its hairline coincides with the etched line seen in the background and marked "Pelvic tilt . . . ." It is important that the magnifier line coincides precisely with the pelvic tilt line. This is accomplished by maintaining eye level so that both lines are exactly superimposed upon each other.

11. Read. This represents the angle of pelvic tilt.

At this point it becomes only a matter of placing the necessary number of ⅛" shims under the foot of the involved side until the pelvic tilt returns back to zero. When this precise point is reached, the total thickness of the shims adds up to the equivalent necessary to raise that extremity to the level of the normal one.

SUMMARY

The classical and most widely accepted method of measuring the length of the lower extremity is basically unsound since such measurement is wholly dependent upon landmarks which are not delineated with sufficient clinical precision to offer reliable points of reference for practical needs. The degree of accuracy by this method is no

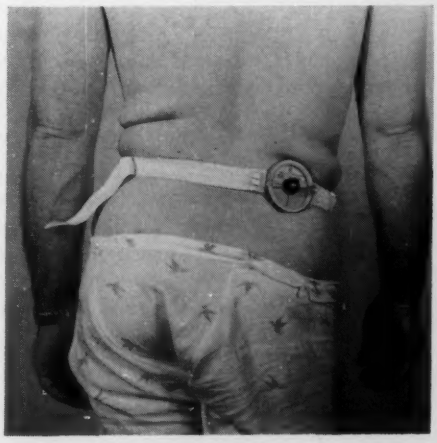

FIG. 8. Goniometer ready for adjustment.

better than ± 1". X-Ray techniques are awkward, expensive, and time consuming.

Since prosthetic means (such as shoe build-up, or in the case of the lower extremity amputee, shortening or lengthening of the prosthesis* are necessary to compensate for the difference in length between the two extremities, and since the gross variation by the conventional method of measurement is too wide for accurate prescription of the prosthesis, subsequent pathological sequelae are inevitable if the correction is inadequate. Guesswork has to be employed by "cutting and trying" until reasonable equality in length between the two extremities is secured.

A method of measurement is described whereby the classical bony landmarks are ignored. By means of the fluid dual goniometer the pelvic tilt is ascertained to an accuracy of ± 2°. The shortened extremity is shimmed up until the pelvic tilt is restored to zero. The total thickness of the shims thus obtained represents the shortening of the extremity to an accuracy of ± ¼".

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* If the prosthesis is too long, the pelvic tilt will be toward the sound side and the shims should be placed under the foot on the sound side until the pelvic tilt is restored to zero. The total thickness of the shims thus obtained represents the excess length of the prosthesis.

Conversely, if the prosthesis is too short, the pelvic tilt will be toward the amputated side and if that is shimmed up until the pelvic tilt is restored to zero then the total thickness of the shims thus obtained will represent the amount of shortening of the prosthesis.

In both instances the accuracy range will be ± ¼".

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Abstract

PLASTIC TUBE TECHNIQUE OF CENTRIFUGAL SEPARATION OF LEUKOCYTES FROM HUMAN BLOOD

LENNART JUHLIN, M.D., AND WALTER B. SHELLEY, M.D.

(*Blood, Journal of Hematology*, October, 1961)

The leukocyte is gradually revealing itself as a pathogenic factor in certain disease states. The extent to which this new role can be surveyed depends in part on the ease with which leukocytes can be harvested for such studies. We have devised a simple, rapid, centrifugal technique which permits the isolation of viable, chemically untreated leukocytes from small samples of venous blood. Heparinized blood is centrifuged in a unit consisting of two glass reservoirs joined by a narrow plastic tube. After such centrifugation, an elongated buffy coat can be clearly visualized and fractionally sampled by precision slicing of the tubing. Such fractional samples show a white cell distribution pattern which reflects the relative specific gravities of the cells. Thus, the lighter lymphocytes are more concentrated in the upper portion, and the heavier granulocytes concentrate in the lower part.

This study was conducted under the sponsorship of the Commission on Cutaneous Diseases of the Armed Forces Epidemiological Board and was supported by The Surgeon General, Department of the Army.

Lightning Stroke Injury—A Report of Multiple Casualties Resulting from a Single Lightning Bolt*

By

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AND

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THE MEN of rifle companies A and C, First Battle Group, 153rd Infantry, were participating in a marching fire exercise on a rifle range at Fort Polk, Louisiana. It was mid-afternoon, Monday, August 8, 1960—the beginning of the second week of summer field training for the units of the Louisiana-Arkansas National Guard. All during the preceding week, heavy, black thunder clouds had developed over the training area, but little rain had fallen. This day, however, the usual threatening clouds were accompanied by blinding rain, heavy thunder and frequent flashes of lightning. As the rain increased in intensity, visibility became so poor that the men on the range were ordered to cease firing but hold their positions. The soldiers who were not actually engaged in the exercise sought refuge in a nearby grove of pine trees.

Lightning was observed to strike several times in wooded areas at some distance from the range, and the officer in charge, fearing for the safety of the men under the trees, ordered them into an open space behind the firing lanes. Almost immediately thereafter, a tremendous bolt of lightning struck among the men on the range and 16 of the 67 soldiers in the general area sustained injuries of varying severity.

The positions of the injured men are shown in diagrammatic form in Figure 1. Soldiers A and B in Lane 8 suffered direct hits, while Soldiers C through P were knocked down but exhibited no evidence of having been struck directly. The cases are presented in detail.

Soldier A was the most severely injured. He had no knowledge of what had happened to him and was either unconscious or confused for approximately one hour.

On the left central position of his steel helmet there was a scorched area approximately the size of a silver dollar. There were multiple ragged tears in his clothing (Fig. 2a) and underclothing; a portion of the metal zipper of his trousers had been disintegrated (Fig. 2b); a ragged hole was present in the leather tongue of his left combat boot (Fig. 2c); the wooden hand guard of his M1 rifle was splintered and the metal breech of the rifle was seared.

When first seen at the 159th Evacuation Hospital, approximately 30 minutes after the injury was incurred, the patient appeared critically ill. He was extremely pale and his skin was cold and clammy. He was conscious but disoriented and incoherent. His eyes were fixed and staring, he moaned softly, trembled violently and his lips were covered with blood. His breathing was rapid and labored. The patient coughed frequently and fresh blood trickled from his mouth.

Physical examination revealed a linear

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first degree burn, beginning behind the left ear and extending down the neck to the suprasternal notch. From this point, a sharply demarcated, denuded strip extended downward over the sternum to the upper abdomen (Fig. 4). There were several abraded areas over the mons pubis. The entire left leg was swollen and exhibited a bluish red discoloration, apparently due to an extensive, diffuse contusion. The hair of the lower leg was singed and there was a first degree burn of the upper tibial area which culminated in a large abraded zone at the junction of the lower and middle thirds of the tibia, corresponding with the level of the upper margin of the patient's combat boot (Fig. 5). Apparently the lightning bolt had struck the patient directly on his steel helmet, ranged down his body and emerged at the site of the lesion on his lower leg.

The mouth and throat contained fresh blood, but a bleeding point could not be identified. Coarse rales and rhonchi were heard throughout both lungs. There was marked tenderness to palpation over the entire left anterior thorax. The right ear drum was perforated and a thin serosanguineous fluid was draining from the external auditory canal. The left drum was obscured by an accumulation of cerumen. The blood pressure was 90/40 mm. Hg. and the pulse was weak and rapid. The remainder of the examination was essentially negative.

The patient gradually became aware of his surroundings and after a short interval (about 20 minutes) he was able to speak coherently. However, he continued to have brisk hemoptysis; breathing became more

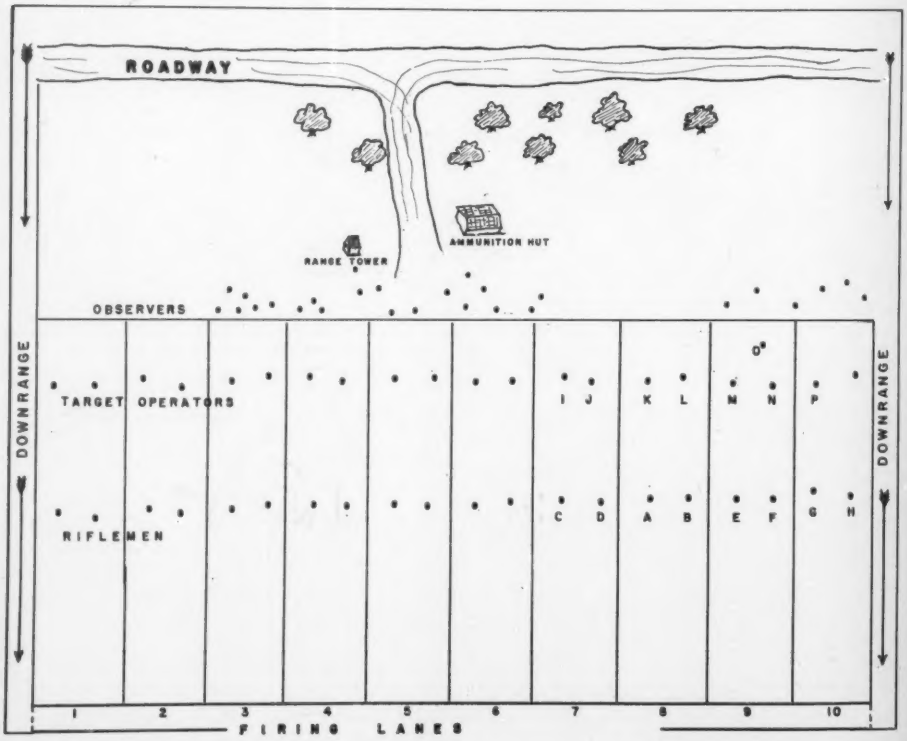

FIG. 1. Diagram of rifle range, showing approximate positions of injured men.

difficult; he complained of severe chest pain; slight cyanosis appeared, and the pulmonary rales and rhonchi became increasingly more pronounced.

Following a tracheostomy and aspiration of blood from the upper bronchial tree, very marked improvement was noted. A roentgenogram of the chest at this time revealed a congenital malformation of the fourth rib on the left. There were poorly defined, patchy densities in the upper hilar and paramediastinal areas with radiation outward and upward into the upper lobes of both lungs (Fig. 6). Roentgenographic examination of the left leg was reported to be negative but later films disclosed a nondisplaced fracture of the junction of the middle and lower thirds of the left tibia. A blood count revealed a leucocytosis of 18,450; polymorphonuclear leucocytes, 88%; lymphocytes, 9%; monocytes, 3%; hematocrit, 51% and hemoglobin, 15.5 gms.

The patient was considered to be suffering from shock, concussion, skull fracture with rupture of the right tympanic membrane and egress of cerebrospinal fluid from the ear, multiple first and second degree burns and pulmonary contusion with hemorrhage. Respiratory tract bleeding gradually subsided during the next 12 hours, and by the morning of August 9, 1960, the patient was bright and alert, complaining only of continued soreness in the left anterior chest and in the left leg. Serosanguineous fluid was now observed to be draining from the left external auditory canal, as well as from the

FIG. 2b. Disintegrated zipper from trousers of Soldier A. The cloth is slightly charred along the course of the missing portion of the zipper.

FIG. 2a. Left trouser leg. Soldier A.

FIG. 2c. Portion of tongue of left combat boot, Soldier A. Note that the damage to this article appears to have been produced entirely by mechanical force. There is no evidence of thermal effect.

FIG. 3. Portion of damaged raincoat worn by Soldier B.

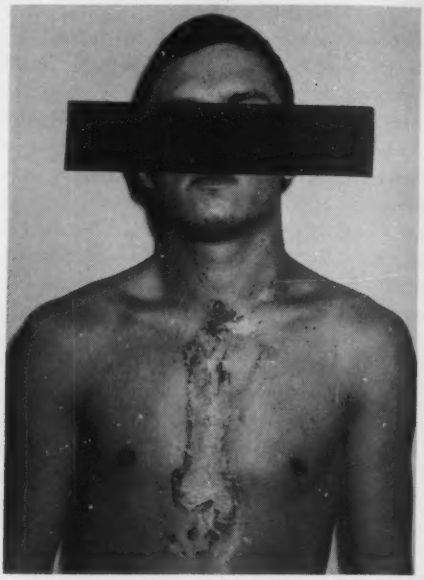

FIG. 4. Photograph of Soldier A, showing appearance of anterior chest 10 days after injury.

FIG. 5. Left leg of Soldier A, showing point of exit of lightning bolt. Photograph taken 10 days after injury.

right ear. His condition at this time was considered satisfactory to allow evacuation by helicopter to a hospital where more definitive care was available, and the transfer was accomplished without incident.

Subsequent recovery was complete in all respects, with the exception that bilateral myringoplasties were only partially successful and chronic otitis media associated with moderate, bilateral, conductive-type hearing loss has persisted. The patient was finally released from hospital care on March 1, 1961, after a prolonged period of hearing rehabilitation.

Soldier B, although the victim of a direct hit, was oddly enough the only member of the injured group who could supply a detailed account of his experiences. He was first aware of a tremendous flash of light and then experienced a sensation of violent

muscular contraction and rigidity of his entire body. He was unable to move. He felt "paralyzed," "rooted to the ground." His vision then began to dim and he was aware that he was falling backwards. He did not know what had happened but he was convinced that he was dying or perhaps already dead. As he fell, he apparently lost consciousness momentarily but must have recovered almost immediately. He was then aware that he was lying on his left side. Blue smoke was rising from the ground around him and from his body. There was a bitter taste in his mouth and an odor "like burnt gun powder" was detectable. He was unable to feel or to move his legs and his left arm. His raincoat and clothing were torn and disarranged. He could not see his left arm but the shattered sleeve of his jacket was visible and he concluded that his arm "had been torn off." On looking about for possible aid he saw his comrades running from the area and he then thought "My God, they are going away and leaving me to die." He was able to move his right arm and he held it erect in a feeble gesture to attract attention. Remembering that his brother (Soldier F) was in the next lane (No. 9), he feared for his brother's safety. Finally he was aware of being lifted and placed in an ambulance but believes that he lost consciousness briefly on several occasions while en route to the hospital. He was alert and well oriented on arrival.

Inspection of Soldier B's clothing and equipment disclosed that his raincoat was literally torn to shreds (Fig. 3). The left arm and right leg of his fatigues were split open and torn. There were many ragged holes in his uniform. The field pack on his back contained an aluminum mess kit which had been bent and dented by what appeared to be a blunt object (i.e., a spent bullet). The dents were slightly seared. There was also a burned area on one of the metal entrenching tools in the pack.

Examination of the patient's body disclosed a large area of edema and discoloration, with multiple superficial lacerations on the inner aspect of the left upper arm. A similar lesion was present on the opposing surface of the left lateral thorax and back. Multiple small burns were present on the back, extending downward to the buttocks. The hair of the scrotum and right leg was singed. Linear burns encircled the right thigh, ranging downward and anteriorly to meet just above the knee and then follow the anterior surface of the lower leg downward to culminate in a large abraded area at the upper level of his combat boot. The lightning had apparently struck between the patient's left upper arm and the lateral chest wall, then passed downward to emerge from the right leg. Except that the patient was pale, cold and trembling, there were no other abnormal findings. The blood pressure was 106/48 mm. Hg. The pulse was 64 beats per minute and the temperature was 99°F. Rest, warmth, reassurance and local treatment of the burned areas brought rapid improvement and the patient was discharged from the hospital on August 9, 1960.

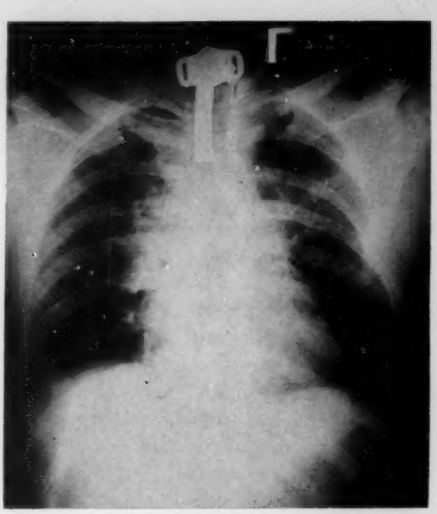

FIG. 6. Roentgenogram of the chest of Soldier A, taken shortly after tracheostomy on August 8, 1960. The densities in the hilar, paramediastinal and upper lobe areas are believed to be due to intrapulmonary hemorrhage.

Soldier C suffered no visible injury, but,

like the others, he was pale, cold and obviously frightened. He trembled violently and complained of pain in his right great toe. The toe was colder and whiter than the remainder of the foot. A blood pressure recording was 120/74 mm. Hg. The pulse rate was 70 and the temperature was 98.8°F. The patient responded quickly to warmth and rest but normal color did not return to the involved toe for several hours, and it remained slightly painful for about two days.

Soldier D was knocked from his feet but he immediately arose, ran to the ammunition hut and sought refuge there. When seen at the hospital he was cold and frightened. He was not injured, however, and his recovery was quick and uneventful. His blood pressure was 130/70 mm. Hg; pulse, 70; temperature, 98.6°F.

Soldiers E through P were all knocked down, and they complained variously of headache, stiff neck, low back pain, numbness and pain in the arms or legs and general body soreness. One had a slight contusion of the right shoulder. In two instances, the cloth straps inside of helmet liners were broken and one soldier claimed that a splinter had been chipped from the wooden stock of his rifle but this was unconfirmed. None of these men could furnish any details as to what had happened to them other than vague statements that they were struck down by a blow on the head, the back, etc. One described a "shock" which ascended from his feet.

On the same afternoon lightning bolts struck in the general training area on three other separate occasions. A soldier standing under a tree was knocked to the ground when the tree was struck. He apparently lost consciousness for a short period and was observed to have multiple "asystolies." When seen at the 159th Evacuation Hospital approximately an hour later, he had completely recovered. His pulse was regular, with a rate of 82 beats per minute, and examination of the heart was negative.

A generator and a telephone switchboard were also damaged by lightning. One soldier near the generator and four soldiers working at the switchboard were knocked down but sustained no specific injury. An officer who was speaking on the telephone at some distance from the switchboard received a severe shock from the instrument. Thus a total of 23 individuals were affected by lightning on the same day.

Discussion

The world literature abounds in reports of injury due to lightning. In most instances isolated cases are described with only occasional reports of mass casualties resulting from a single thunderbolt. In the latter category, the most notable disaster occurred at Ascot, England in 1956[1] when lightning struck into the throng at the famous race course. Fifty one people were affected; twelve were rendered unconscious; 15 sustained burns of varying intensity; two died as the result of head injuries and the remainder suffered miscellaneous trauma.

There is a common belief among the laity and to some extent among members of the medical profession, that thermal injury constitutes the major effect of lightning. The mechanical effect of thunderbolts and the almost infinite variety of somatic injuries which may result is poorly appreciated.

The following effects of lightning have been described: burns, first to third degree in severity;[1,2] lacerations,[3] of skin,[3] blood vessels,[3] dura,[3] brain,[3] tympanic membranes[1,3] and diaphragm;[3] rupture of heart,[3] intestine,[3] brain[3] and pregnant uterus;[4] fractures, of skull,[1,3,10] tibia[3] and fibula;[3] amputation of extremities;[5] spinal atrophic paralysis with muscle wasting and fibrillation;[6] arterial spasm;[7,8] myocardial infarction;[9] auricular fibrillation;[10] ventricular fibrillation;[3] cardiac arrest;[3,11,12] cataracts;[1] retinal detachment;[13] deafness;[1] shock;[6] pulmonary edema;[14] respiratory arrest;[3,12] hysteria;[15] "suspended animation"[6] and psychosis.[16]

The pulmonary manifestations of light-

ning stroke injury are of considerable interest. Congestion of the lungs,[1] petechial hemorrhages[1] and more extensive bleeding into the pulmonary parenchyma have been described at autopsy by some authors.[17] However, the literature contains scant reference to chest x-ray findings in living patients who have been struck by lightning. Ritvo[14] has reported a fascinating case of pulmonary edema following injury of this type. This patient's roentgenograms disclosed "diffuse, irregular, mottled density throughout both lung fields" which cleared spontaneously after a few days.

Ravitch and his co-workers[12] have recently described the case of a 10-year old boy who was rendered unconscious by the direct impact of a bolt of lightning and who remained apneic for 22 minutes before effective respiratory assistance was applied. On about the fifth day the patient developed a "diffuse pneumonic infection" associated with tachycardia and tachypnea but the actual roentgenogram is not described.

One of the patients described in the present report (Soldier A) apparently sustained a contusion of the lung which resulted in severe pulmonary hemorrhage. The densities which were seen in the upper lung fields on the chest x-ray were believed to be due to the intrapulmonary bleeding. To our knowledge, this is the first case in which severe hemoptysis has been encountered as a result of lightning stroke injury.

From the foregoing it is apparent that the pulmonary manifestations of lightning stroke injury may be summarized as those due to hemorrhage, edema and infection.

Although burns may be extensive and serious in nature, it is the mechanical force of thunderbolts which causes the greatest damage;[18] i.e. contusions, fractures and rupture of important internal organs.

Many authors have attempted to explain the mechanisms by which the mechanical effect of lightning is produced. Spencer[2] in 1932 attributed the burns to the production of superheated air and the mechanical effect to the force of expanded and repelled air around the flash and to the "sledge hammer blow" caused by compressed air pushed before the current.

According to Pritchard[19] the effect of lightning is entirely explainable on the basis of electrostatic forces. The electrical charging of a body occurs as a consequence of the lightning blast by transference of charge from the lightning to the object which is struck. If the object is well grounded the charge will run off rapidly, but if the ground contact is poor the charge will accumulate. The sudden development of large numbers of similarly charged bodies on an object results in a powerful mechanical expulsion of some of these bodies producing a violent bursting effect, followed by a wave of decompression and distortion. It is this expansile force which supposedly accounts for the tissue damage produced by lightning.

The treatment of lightning stroke injury is as variable as the nature of the specific lesion produced. However, certain therapeutic procedures of outstanding importance are deserving of emphasis. In one of our patients (Soldier A), tracheostomy was considered to be life-saving. Ravitch, et al.[12] have stressed the sequence of respiratory arrest, anoxia and resulting cardiac standstill in some cases, pointing out the extreme importance of prolonged artificial respiration, cardiac massage and associated hypothermia.

The incident reported here actually contributes little that is new to what has previously been recorded about lightning stroke injury, but the tremendous interest created by this occurrence among physicians who were required to manage these cases, together with their almost uniform lack of information on this subject, stimulated this review in the belief that a renewal of knowledge may always be of future benefit.

Unfortunately, there does not appear to have been any way in which this near-tragedy might have been prevented, and lightning stroke injury must simply be added to the

list of hazards encountered by the soldier in the field.

Summary

1. An incident is described in which 16 soldiers in an open field were injured by a single flash of lightning while seven other individuals were affected by three additional thunderbolts on the same day.

2. Two soldiers suffered direct injury and in one profuse pulmonary hemorrhage was the outstanding manifestation of trauma. This symptom has never before been described as a result of atmospheric electroshock.

3. The detrimental effects of lightning stroke and the mechanisms of injury are reviewed.

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Ophthalmic Surgery at a Station Hospital—The Experience of One Year

By

CAPTAIN PAUL J. SIMEL, *U. S. Army**

THIS is an attempt at compilation of the surgical procedures, both major and minor which have been done at the U. S. Army Hospital, Fort Sill, Oklahoma, during the period from 1 August 1959 to 1 August 1960. These operations were done using the facilities of the hospital without recourse to the facilities of a general hospital. The purpose for which this paper was compiled was to review what surgical experience is available to the ophthalmologist within the confines of the Army Medical Corps. This is not intended as a critical analysis of results, techniques or choice of procedure, but implies only that which could be done by any trained ophthalmic surgeon while serving in the United States Army. There are certain conclusions to be drawn from these figures, but the main point is that there is enough available to the young surgeon to consider the gains in training and experience which can be his during his service career.

A consideration of the listed procedures will summarize their number and variety:

Major	132
Minor	265
Total	397

Strabismus	78	Trauma—minor	35
Cataracts and their complications	19	Tear sac	6
Lid tumors	7	Lid plastic	4
Glaucoma procedures	8	Corneal surgery	4
Ptosis	3	Biopsies	29
Trauma—major	3	Chalazia	123
		Pterygia	68

A survey of the outpatients seen reveals some interesting findings. The total number of outpatients had been increasing each month by 20 visits. The average number seen was 250 each month during the last 11-month period, varying from 187 at first to 386 in the last recorded month. There is, of course, a preponderance of surgical pathology on a percentage basis of the total number of outpatients, 17.6% of all patients seen being in need of surgical care. This is a startling figure and can hardly be duplicated in civilian practice except in a few isolated cases of well known ophthalmic surgeons who by reason of long years have developed essentially an eye surgery practice. The reasons for this percentage are varied. The screening of the patients is done by a staff of three optometrists and ancillary personnel. There are direct referrals from the outpatient dispensaries without any delay. Since the treatment or consultation takes only the time of the patient and he is not charged, there is more tendency to take advantage of the facilities available when they become known.

STRABISMUS

This is a preponderant part of the surgical practice. The number of strabismus cases seen and treated by medication, glasses and orthoptics far exceeded the number of surgical cases. One hundred and ninety-six cases were seen in addition to the 70 operated upon. This includes high phorias as well as manifest deviations.

This would seem like a large percentage of surgical to non-surgical cases but there are cogent reasons for this being so. The remarkable mobility of families in Army service and the frequent non-availability of ophthalmologic care tends to bring patients who have waited until the "next station" before seeking eye care for their children. The constant concern that a child will not

* Capt. Simel is an ophthalmologist. He recently left the military service and is now located at 1311 North Elm St., Greensboro, N.C. This is the experience of one of many officers who have rendered valuable service to the country and in so doing profited professionally.

have access to this care consecutively makes surgery more imminent in these cases. Then again, the two year enlistments and the six-month National Guard obligations which are being served brings to the attention of the ophthalmic surgeon many persons with cosmetically deforming squints who have not had any access or funds for eye care prior to their entry into Army service. Surprisingly many of these cases have secured fusion in their immediate post-operative period.

The response to the availability of surgical treatment for them at a station hospital has been surprising and unusual. There were no refusals when surgery was offered as the only alternative for correction. These patients were told that they were not compelled to comply with the recommendations but they have invariably accepted them.

The patients treated for strabismus were:

Dependents: 61 (Of Enlisted Men 48; Of Officers 13)
Officers: 1
Enlisted: 26
Race: 5 Negro, 73 white
Sex: 28 female, 50 male
Age: Less than 14 years (50); older than 14 (28). Age spread from 11 months to 42 years.
Types of strabismus: Esotropia 38, Exotropia 33, Hypertropia 26 (many had both a horizontal and a significant vertical deviation)
Muscles operated upon: Medial rectus 71, Inferior rectus 5, Lateral rectus 77, Inferior oblique 23, Superior oblique 1, Superior rectus 5.

Cataract Surgery

Here, too, we saw a preponderance of cases who were surprised when the possibility of correction for their defect was mentioned. The sequelae of trauma which occurred during active Army service were invariably very well handled by Army ophthalmologists elsewhere. Those who were referred for long standing defects incurred before or after service were gratified to learn that surgery could be handled at this hospital.

Patients treated for cataract were:

Dependents: 12 (Of Officers 5; Of Enlisted Men 7)
Officers: 3
Enlisted : 4
Race: 19 white
Sex: 7 female, 12 male
Types of cataract: 10 senile, 3 traumatic, 3 secondary, 2 Mongoloid, 1 phacolytic glaucoma
Age spread: 4 years to 68 years 13 below 45 years

Glaucoma Procedures

As would be expected in an age group which is relatively young the number of glaucoma procedures is small. However, there is variety even among the eight procedures accomplished. One iridectomy, one Scheie procedure, three iridencleises, one cyclodialysis, one cyclodiathermy, and one combination goniotomy-goniopuncture procedure were accomplished on persons younger than 38. Three of these operations were performed on a three-year-old child with neglected congenital glaucoma with pressures of 65 mm. of mercury. Schiøtz and 17 mm. corneal diameters. One Scheie filter was done on a 26-year-old Negro woman who had intractable secondary glaucoma following total corneal graft, extracapsular extraction and total iridectomy done elsewhere. Only one procedure, an iridencleisis, could be considered to be the "usual," that performed on a 38-year-old white woman with poorly controlled open angle glaucoma.

Tear Sac Surgery

Several of these cases were young persons who had many acute attacks of dacryocystitis that were cleared with antibiotics but did not know that their chronic tearing and dacryocystitis could be helped.

Patients treated were:

Sex: 5 females, all dependents
Age: 24 to 52

Race: White
Operations: 5 dacryocystorhinostomies, 2 dacryocystectomies (in a congenital luetic with saddle nose)

Major Resections and Lid Repairs

Here these patients were almost all aware of their tumor or need for repair of cosmetically deforming lid defects.

Patients treated:
Dependents: 14
Soldiers: 3 officers
Age: 18 months to 52 years

The variety of surgery was from simple Z-plasties, lid fold repairs, block excisions and plastic repair to bilateral skin grafting for cicatricial ectropion of the upper lids. Two limbal and one orbital dermoid were excised, a huge hemangioma of an upper lid removed and a lacerated cancaliculus was repaired. Three ptosis procedures were also done. One of these was a maximal levator resection in a three-year-old child with complete ptosis previously operated on elsewhere in whom two Guyton-Friedenwald sutures had broken down. Another procedure was the repair of a Marcus-Gunn ptosis done elsewhere who post-operatively had jaw winking, a poor lid fold and a notch due to a still intact levator; the other ptosis procedure being the classical Blaskovics.

Corneal Surgery

One patient, a dependent, presented herself with lifelong corneal leukoma, extensive anterior synechiae and minimal vascularity of these lesions. Through the kind assistance of the Oklahoma Eye Bank, donor material was secured and a penetrating graft done. Three soldiers with decreased vision, irritated red eyes from extensive recurrent pterygia and in one case from a sulfurous acid burn, had keratectomies and peritomies performed in preparation for future corneal grafting.

Trauma and Its Sequelae

For lack of exact topography or classification there is included one penetrating knife wound of the eye, with vitreous and ciliary body prolapse, which was repaired, one vegetable corneal foreign body removed in an 11-month-old child and superficial excision of the vascularity about it, and an iridocapsulectomy in an 11-year-old Negro male. These were done in dependents of enlisted men, all under the age of 14.

Thirty-five cases of lid trauma were repaired in the emergency room, which could not be handled by the emergency room physician. Only one had to be taken to the operating room and the repair in the emergency room never took more than two hours, most, however, being of much less extent and requiring no more than thirty minutes.

Outpatient Procedures

Pterygia. This is a series that was operated on in Southwestern Oklahoma, known for its singular absence of humidity and for its high ration of dust, high heat and high winds. This area is a good breeding ground for rapid growth of pterygia. With enthusiasm at first and with more and more distress to the surgeon pterygia were excised and cauterized, transplanted, reversed, buccal membranes transplanted, etc., et al. All surgical measures met with poor success. The surgeon was forced to conclude that without the availability of beta radiation and with a recurrence rate approaching 30% these could be best handled elsewhere. There was no appreciable difference in recurrence rate with transplanting or excisional techniques, with and without the use of an operating microscope, presence or absence of large vessels, etc. These cases were seemingly "a different breed of cat" than the more sedate and kindly pterygia of the New England area where I had been.

The non-availability of beta radiation made for an absurd waste of hospital time, since those requiring further surgery with radiation, had to be transferred 400 miles to the nearest Army General Hospital. We, therefore, chose to do fewer and fewer operations for pterygia unless there was an advancing zone of opacity anterior to the head, if there was a sudden increase in size, if they were symptomatic, or the vision was

threatened. Too much patient morbidity occurred unless these criteria were rigidly adhered to.

Cases of pterygia treated:

Enlisted:	46	Caucasian:	30
Officers:	15	Negro:	31
Dependents of EM:	5	American Indian:	5
Recurrences:	19	Type of operation:	
Recurrent pterygia	28	Bare sclera	32
Primary operation	38	Transplantation	30
Visual loss	3	Buccal graft	4

Chalazia and Excisional Biopsies

Chalazionectomies numbered 123. One could busy himself doing these alone unless the number referred were kept down by occasional pleadings to the referral staff. Time lost from duty was kept to a minimum by treating these cases surgically as the primary treatment when compared to medical treatment alone. Only nine chalazia were removed from dependents, presumably the major portion of these being treated medically by the physicians in the outpatient clinic. Soldiers, however, were referred within a few days of onset. Since hot applications and instillation of ointments or drops was manifestly impossible in most cases, the offending area was excised with gratifying lack of lost time to the patient.

Biopsies were all of the excisional type and included lid and facial plastic repair of a minor nature easily accomplished in the clinic. There were 29 cases and the variety of pathology was from steatomas, basal cell carcinoma, squamous cell carcinoma to a "calcifying epithelioma of Malherbe." There were nine soldiers, and twenty dependents, all of adult age.

Summary and Conclusions

An accounting of the surgery available to the ophthalmic surgeon at a station hospital in the continental U. S. in one year is summarized and tabulated. No attempt is made to justify choice of procedure, indications for or results of this surgery. There were 397 operative cases, 132 of which could be considered major. These varied from strabismus operations to corneal grafting.

One can see from the number and variety of surgical cases that not only do the patients receive ophthalmic surgery care but that the surgeon who wishes will benefit to a marked degree in terms of experience, facility, and confidence.

CALL-UP STATUS OF MEDICAL AND DENTAL RESERVE OFFICERS IN RESIDENCY TRAINING CLARIFIED

The Army has clarified the status of those medical and dental reserve officers undergoing residency training and who are members of reserve units that have been alerted for active duty.

These officers will be transferred to the U. S. Army Reserve Control Group (Delayed). Reserve medical officers engaged in full time residency training who are not "Berry Plan" participants may be delayed from call to active duty provided they can complete the final year of any accredited residency program within nine months subsequent to October 1, 1961. These officers must agree to serve two years of active duty effective June 30, 1962. Officers who cannot complete their residency by June 30, 1962, will not be deferred or delayed.

Food and Water Supply In Nuclear War

By

MAJOR THOMAS R. OSTROM, MSC, *U. S. Army**

RADIOLOGICAL contamination of food and water may be expected to result from nuclear explosions. The reaction of the civilian population to nuclear testing indicates that the problems of monitoring and decontamination as they affect food and water will create problems for both military and civilian populations. These are not independent for the author believes the military will perform these functions not only for the military but also for civilian communities as well and in some cases, where the civil food stocks are destroyed, military supplies will be made available for civilians. Thus, it is necessary to appraise the problem in its entirety, having regard for the magnitude of the problem, civilian capabilities and available military assistance.

Present information and experience do not provide adequate information concerning the type of warfare and its duration, the levels of radioactivity to be expected, the maximum permissible concentrations of radioisotopes in food and water, the size of the ration to be allocated or the availability of radiological laboratory facilities. However, the military, under all circumstances, must be prepared to cope with the problems arising from the maximum use of nuclear weapons. They must assume that unlimited nuclear warfare will occur. Thus, it is not unreasonable to assume a total fission energy release of 20,000 megatons within a one year period. Not only this but the long term hazard posed by strontium 90 must be considered. Based on current experience, it is estimated that a total deposition of fifteen curies per square mile of strontium 90 might well occur in some areas.[1] As is well known, strontium is similar to calcium and it follows a similar path in our diet.[2]

WATER SUPPLY

With the assumed magnitude of energy released, the level of total beta radioactivity in surface water sources could be expected to range from barely detectable amounts to one microcurie per milliliter. Surface or sub-surface bursts of nuclear weapons in or near surface water supplies could contaminate these supplies above acceptable levels for drinking and thus create a serious problem.

The established criteria of lifetime maximum permissible concentrations established for non-occupationally exposed persons will not apply in nuclear warfare. The suggested value for one month's consumption of water proposed by the United States Public Health Service is not usable due to the short time of consumption upon which the maximum permissible concentration is based and the rapid decay rate of the radioactivity. The value recommended by the Office of The Surgeon General, U. S. Army, for a year's consumption is 3×10^{-4} microcuries per milliliter[3] total beta-gamma radioactivity. This is assumed to be acceptable for the purposes of this paper.

The present maximum permissible concentration for strontium 90 is 4×10^{-6} microcuries per milliliter.[4] In view of the numerous hazards of war, it is assumed that a two and one-half fold increase in this value is probably justified and that a value of 10^{-5} microcuries per milliliter of strontium 90 is acceptable.

The water purification processes available at present are of varying efficiency. Municipal treatment plants are not capable of removing more than 70 percent of

The opinions expressed in this article are those of the author and are not to be construed as representing policy of the Department of Defense or Department of the Army.

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the radioactivity in water[5] but some ion exchange units are capable of removing over 99 percent[6] of the radioactivity. Currently, the U. S. Army Corps of Engineers has available a mobile water purification unit which has been tested and shown to have removal efficiencies varying between 50 and 85 percent.[7] The unit is made in various sizes with capacities ranging from 600 gallons per hour to 250,000 gallons per day. In addition, the Corps of Engineers have thermocompression distillation units with production rates of 60, 150, 300, and 1,250 gallons per hour. This equipment has been shown to be capable of removing 99.98 percent[8] of the radioactivity.

Should the maximum assumed level of contamination of a surface water supply (1 microcurie per milliliter) occur, the external radiation hazard will be in excess of 5 rad per hour. This would prevent personnel from operating a water plant in the area. In such a case, there are two alternatives. Either the water can be conveyed by existing aqueduct to a plant outside the area where adequate treatment can be given or a substitute supply must be found. However, the source need not be abandoned permanently because it will be possible to reenter the area and commence treatment after a maximum wait of one week. At that time, assuming a decay rate according to the $t^{-1.2}$ law, the maximum possible concentration of beta-gamma activity in the situation outlined above will be less than 0.01 microcurie per milliliter. Neither municipal plants or conventional Corps of Engineers equipment are capable of providing with certainty, the 99 percent removal required to achieve 3×10^{-4} microcuries per milliliter recommended by the Office of The Surgeon General, U. S. Army, if levels in excess of 0.01 microcurie per milliliter are encountered.

Other possible sources of water such as wells or springs should not be overlooked. Wells are to be preferred to springs because they are less likely to be contaminated. Wells in fallout areas have been found to be free of radioactivity and laboratory studies have demonstrated that soil acts as an excellent filter and adsorption medium.[5]

On the basis of the known information and the assumption outlined above, it is possible to outline a course of action. Routine monitoring of surface water supplies should begin as soon as nuclear warfare starts. This, in all likelihood, can be done by the municipal authorities themselves, unless they are destroyed or contaminated. Should civil monitoring not be possible, the task may have to be taken over by the military forces.[9] In such an event, samples of water would be collected by preventive medicine or other medical service personnel and analytical services would be supplied through either the Chemical Laboratory (TOE 3-97D)[10] or the Medical Laboratory (TOE 8-650D).[11]

Under certain circumstances, the population will be faced with a contaminated supply which cannot be handled by conventional treatment. It should be emphasized that even in the worst situation, the levels of radiation in water will decay to acceptable levels within a week and, in most situations, within two or three days. During this period when the supply is not usable, a potable drinking water can be provided by various means such as use of an alternate source, transport of water, ion exchange or distillation. A word should be said regarding these methods.

The use of an alternate source will be feasible in many instances because it is now possible to lay pipelines from unaffected areas with considerable speed. Flexible plastic pipe is now available and can be laid rapidly. In the event this cannot be done, safe water should be distributed by tank trucks from distribution points provided with Corps of Engineers water purification units. Water transport team GH (TOE 5-500C)[12] may be used for this purpose. Water purified by ion exchange units will be radiologically potable. However, this is an expensive method of producing safe water and necessitates strict rationing.

It should be discontinued at the earliest possible moment. Distillation equipment would not provide sufficient water for a large population but might be used for small groups.

It should be borne in mind that in small communities it might be possible to drill wells and provide relatively safe water in this way. The Army has well-drilling team GE (TOE 5-500C)[13] for this purpose.

Food Supply

Provision of an adequate food supply presents greater problems than that of water. The size of the population which must be supported will range from a single family unit to the survivors of a large city which may number a million or more. This must be determined along with the size and composition of the ration. It is assumed for purposes of this paper that the ration will probably weigh approximately two pounds per person per day and will consist of meat, cereals, vegetables and packaged foods. In addition, survival rations may be available.

The maximum permissible concentration of radioactivity for food is the same as for water, namely, 3×10^{-4} microcuries per milliliter for total beta-gamma activity and 10^{-5} microcuries per milliliter for strontium 90. Information is available regarding the levels of contamination that could occur in packaged foodstuffs, crops, animals, and methods of decontamination as a result of nuclear weapons testing. This data is of great importance in considering how the food supply will be provided.

It has been found that packaged foodstuffs can become contaminated by either neutron-induced activity or by fallout[14] and still be usable. Experiments have produced results which indicate that the level of neutron-induced activity in packaged food decays to the thirty day preferred risk level (1.1×10^{-3} microcuries per milliliter)[15] within 15 days and to permissible lifetime exposure values within five months.[16] Naturally, the decay rates of induced activity will be a function of the contained elements and, hence, these periods are cited only as a general guide to determine the approximate time required to reach safe concentrations. On this basis, packaged foods will become safe for consumption at the end of one month if the one year consumption value of 3×10^{-4} microcuries per milliliter for neutron-induced activity be assumed. The fallout contamination on the surface of the packages presents no real problem since it can be readily removed by brushing, wiping or washing. Covered bulk foodstuff such as cereals, sugar or salt may be considered as packaged foodstuffs.

Crops can be contaminated both by deposition of fallout and by the absorption of soluble radioactivity from the soil.[14] Leafy vegetables contaminated by fallout particles can be rendered safe by washing and the removal of the outer leaves. With regard to the radioactivity in the soil, it should be noted that it has been found that strontium 90 is discriminated against in the preferential absorption of calcium and strontium so that the strontium 90 levels in plants are seven-tenths those in the associated soil. Furthermore, it is estimated that the meat in livestock has approximately one-tenth the strontium level of the associated soil while the bone has one quarter. Thus, natural elimination of strontium 90 is constantly occurring and the slaughtering and processing of livestock should be sufficient to provide adequate decontamination. This also will remove the contamination caused by the deposition of particulates on animal hides.

Studies which have traced strontium 90 in the diets of human beings, have indicated that man incorporates this isotope in his body only to five percent of the strontium 90 level in the soil.[17] This means that with the previous assumption of the level of strontium 90 that might occur, (15 curies per square mile), we can expect a maximum level of strontium 90 in human beings of 3 microcuries total body burden. This value is above the occupational limit of one microcurie and below the fixed body bur-

den of 10 microcuries at which level there is assumed to be a noticeable increase in bone cancer.[18]

With this information regarding the magnitude and hazard of the problem, it is possible to propose a solution. Civil Defense and its assisting military units will face a serious problem in ensuring an adequate food supply but this problem is not insurmountable. One of the first tasks will be to impress upon the surviving population that no food should be abandoned as unfit for use. The people must be convinced that although food may be contaminated, it should be saved until radioactive decay removes the radiation hazard and it no longer exists. The theme should be "WASTE NOTHING." In those areas found to be fallout contaminated, people should be advised that all packaged foodstuffs and food in closed cabinets can be used after cleaning the outside of the containers or cabinets. Other foods must have their outer layers removed prior to consumption. Where packaged foodstuffs are stored in bulk, these should be segregated until safe by personnel under the supervision of either civilian or military radiological safety monitors. The laborers need not be skilled since the work involves only the normal task of cleaning. A probable source of supervisory personnel would be veterinary food inspection detachments JA or JB (TOE 8-500C).[19] If sugar, salt, flour and other commodities stored in bulk are contaminated, they should be held until the radioactivity has decayed to an acceptable level. Where food supplies are short and holding is not possible, the material should be blended with uncontaminated material to produce a product that will meet the maximum permissible concentrations. It is readily admitted that this is not the preferred solution but should only be followed where necessary to alleviate severe shortages. This work should be supervised by the veterinary food inspection detachments JA or JB. This will also require low background levels that will permit effective monitoring.

Fallout contamination will not render livestock unfit for human consumption and they can be eaten without ill effect. Veterinary inspection teams should assist in supervising the slaughter of animals to insure the maintenance of adequate health standards. Radiologically sick animals should be slaughtered immediately to reduce wastage of meat. The usual precautions of preventing contamination are all that will be necessary. Radiological monitoring requirements can be reduced if hides, bones, and internal organs are not used. Slaughtering supervision would be an extension of the work of the veterinary detachments monitoring bulk foodstuffs.

Disposal of contaminated waste from large scale decontamination of foodstuffs and of material from slaughterhouses will create a problem. The radioactive material should be collected and buried in a location where it will not be disturbed and the burial area should be suitably fenced and marked. Personnel working in food decontamination stations should be provided with protective clothing and gloves to reduce the possibility of beta burns. In addition, monitoring of personnel should be carried out to reduce the possibility of exposure to gamma radiation. Drainage from decontamination stations should not be permitted to enter drinking water sources.

Nuclear warfare will cause tremendous destruction of personnel and property but the monitoring of food should not be an undue burden. Only when an exceedingly high level of usage of nuclear weapons is used will such a problem arise. The presence of strontium 90 in food need not be considered a danger because of the selective removal by natural discriminatory processes. Decontamination of large volumes of packaged foods can be readily accomplished by unskilled labor under the supervision of one or two men. The primary problem is that of educating the population to "WASTE NOTHING."

Radiological Laboratory Facilities

In the preceding discussion, it was indicated that laboratory facilities with a radio-

logical monitoring capability were required. These laboratories may be located in civil defense organizations, universities, hospitals or municipal agencies such as health departments or water treatment plants. It is assumed that in unlimited warfare that all fixed laboratories will be damaged or seriously contaminated. It is likely that some mobile radiological laboratory facilities will be unusable. If, however, limited use of nuclear weapons occurs then fixed, as well as mobile, facilities might still exist. In either case, military laboratories will be required to assist civilian agencies or to possibly undertake the entire work-load.

The question of available military support is a serious one. Under some conditions military civil affairs units might be available in disaster areas, but it must be remembered that these units do not have laboratory facilities.[20] Thus, the previously-mentioned chemical laboratory and medical laboratory must be utilized. Instrumentation is both available and under development which will provide these military units with adequate monitoring capabilities. The medical laboratory and chemical laboratory can support civil defense and civil affairs efforts as a part of their mission.

Summary

With existing supplies, it is possible to provide food and water for military and civilian populations after a nuclear attack. There are extant methods for decontaminating water, livestock and packaged foodstuffs. The population must be educated to "WASTE NOTHING."

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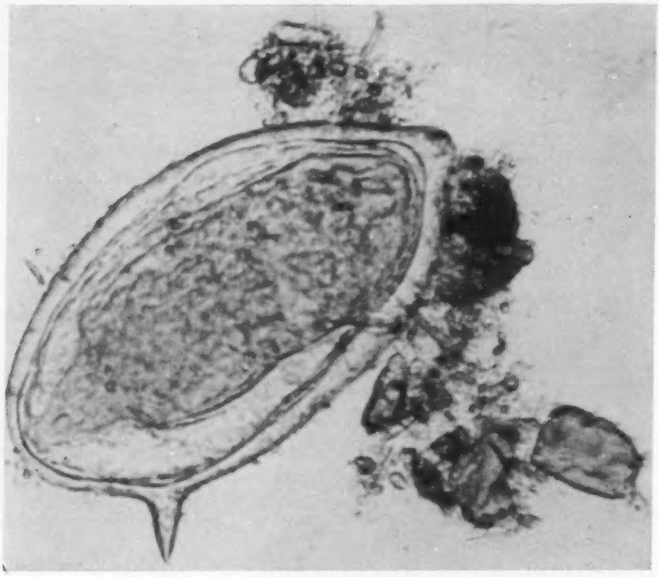
CASE FOR DIAGNOSIS

Microscopic examination of a fecal suspension from a 21-year-old male Puerto Rican Army recruit revealed the structure illustrated in the photograph below.



AFIP Neg. No. 57-6989

From the Armed Forces Institute of Pathology, Medical Illustration Service, Colonel Frank M. Townsend, USAF, MC, The Director.

For diagnosis see page 793.

EDITORIALS

The Case of the Gonococcus

PROTARGOL, permanganate, and argyrol were companions for many years in the treatment of gonorrhea. In the military services there were added to those drugs for the patients, many days of hospitalization, frequently court-martial, and more often than not confinement in the stockade. Patients often became discouraged, sometimes unruly; their attending physicians occasionally became frustrated. The young medical officer who usually fell heir to the VD ward in a military hospital longed for the time when he could be relieved of that duty and hoped that someday there would be better treatment for gonorrhea, at least.

Then along came the sulfa drugs. Hope appeared on the horizon. Would this be the drug to change the picture in the treatment of gonorrhea? Yes, it would. It did. A new era was ushered in. From then on we were going to *cure* cases of gonorrhea. We did until some of the organisms became resistant to the drug.

Then along came penicillin. Now these resistant gonococci were to meet another type of weapon. They did and the treatment of gonorrhea was advanced; the incidence of the disease was reduced. For years this went on. Then some of the organisms became resistant to penicillin.

Now we learn of the rising venereal disease rate, not only in the case of gonorrhea but also in the case of syphilis. Drug resistance to these organisms is not the only reason for this increase in VD rate. There are sociological reasons. While we need some other drug for these resistant organisms we also need something for the non-resistant individual. Many of these VD cases are coming in the adolescent period of life. An intensive educational program is necessary. This educational program should be part of the overall education of our youth. Of course, the responsibility lies in the family initially, but through parent-teacher clubs, health services, family physicians, churches and other organizations a satisfactory program could be developed which might even be put on television. Remember the day when the word "syphilis" dared not be mentioned on radio?

In this connection the article "Gonorrhea Today" (WHO *Chronicle*, Vol. 15, No. 8, August 1961) could be profitably studied.

A Hearing Is in Order

ON May 20, 1958, the Congress passed and the President signed Public Law No. 85-422, 85th Congress HR 11470—"An act to adjust the method of computing basic pay for officers and enlisted members of the uniformed services, to provide proficiency pay for enlisted members thereof, and for other purposes."

Section 3 of this Act did not increase the amount of retired pay, retirement pay, retainer pay or equivalent pay to which any person is entitled on the day before the effective date of this Act.

Section 3(c) added a 6 percentum cost of living increase to the pay to all of those retired on the retired lists on the day before the effective date of this Act.

Section 9. "This Act becomes effective on the first day of the month following the month in which it is enacted." This controlling date became 1 June 1958.

This Act raised the pay considerably of the higher grades, but made very little change in the pay of the lower grades, except it created two new enlisted grades, E8 and E9, thus creating several thousand

vacancies, whose pay rates are much closer to the pay rates of the lower pay grades of commissioned officers.

Those on the retired list prior to June 1, 1958 were told during the hearings that any objections by that group as to their new pay rates, a 6% increase, would jeopardize the passage of HR 11470 in the Congress.

So no objection was made at the time of the hearings of this bill by any of those already retired on the effective date of the bill Public Law 85-422, 85th Congress HR 11470, I June 1958.

For nearly 100 years, except for a period of 4 years, 1922-1926, those on the retired lists of the uniformed services here received up to 75% of the grade and service of any new scale of pay for active duty personnel.

Now, for over 3 years, all of the uniformed service personnel have suffered this discrimination.

Legislation to correct this injustice is long overdue. (It is interesting to note here that all Civil Service, Congressmen, Senators, and the like had their retired pay increased 10%. This increase was made permanent by the present Congress and the President recently signed the bill.)

HR 11318 passed the House of Representatives at the last session of Congress, 20 May 1961, without a dissenting vote. Action was held up on this bill for months by the subcommittee of the Senate Armed Services Committee. In the closing days of that session the full Senate Armed Service Committee, it was decided to defer action in the Senate pending a report to be made by the University of Michigan of the complicated systems of retired pay for the various uniformed services. The matter of recomputation for those on the retired list before 1 June 1958 was only one of the numerous study areas.

After studying the matter for approximately one full year, the recently submitted report by the University of Michigan recommends as to retire pay for those retired prior to 1 June 1958, page 47 . . . "The Committee also concludes that the cost of living method of increasing retired pay not only is the most equitable, but more closely achieves the objectives of the retirement system. Such an approach also provides more flexibility in meeting the needs of the active duty forces. The Study Committee believes, however, that all possible assurances should be given retired personnel and active duty personnel that no major changes are contemplated in the retirement system and that future increases in retired pay can be expected whenever necessitated by changing economic conditions."

In other words, the University of Michigan report recommends periodic cost-of-living changes in retired pay and not to tie in retired pay with active duty pay for those retired prior to 1 June 1958. However, the study does conclude and recommend, page 47 . ."The Study Committee believes, therefore, that the present levels of pay—from 50 to 75 percent of base pay—should be maintained with no income limitations."

It is felt that this is a matter of *National Policy* for the Congress to determine, after giving consideration to the views and recommendations of the President, the Secretary of Defense, the Chiefs of Staff, and other high military officials. Departure from the time-honored policy and practice of basing retired pay on a percentage of current active duty pay should not take place, but if so, only after a fair and reasonable advance notice as a matter of fairness and justice to service personnel who have been influenced to make a life-time career of the military service on the basis of long-established policy as related to retired pay.

President Eisenhower, President Kennedy, (and the then Vice President Nixon) as well as Vice President Johnson, have strongly recommended corrective legislation.

Mr. McNamara, the Secretary of Defense, has recently endorsed this legislation as well as General Maxwell Taylor strongly urged corrective legislation before he retired as Army Chief of Staff.

Funds required for this legislation will steadily and materially decrease at an accelerated rate year by year, as death takes its

toll of the advanced age group involved, who are the victims of this discrimination.

Argument that the proposed legislation contains too great a disparity between retired pay of the higher and lower grades does not appear to be sound or valid. If there is unwarranted disparity it is obvious that it is even greater for present active duty pay. Yet, it was only after most careful consideration that the Congress passed the 1958 Pay Act with the pay scales now in effect.

There can be no justification for paying one group of men of equal rank and length of service less than another, and especially not on a basis of an arbitrarily fixed date.

Many of those adversely affected are veterans of three wars (World War I, World War II, and Korea) and nearly all are veterans of the last two. Many held highest positions of responsibility.

It is an injustice that should be corrected as quickly as possible.

What is involved here is a matter of Congressional National Policy involving morale of personnel of the Armed Forces, retired and active, now and in the future, and National Defense.

We therefore urgently recommend an early hearing before the Senate Armed Services Committee on either Senate Bill 401 (Mr. Goldwater) or Senate Bill 626 (Mr. Jackson).

DEPUTY SURGEON GENERAL, ARMY

Brig. General Howard W. Doan, MC, USA, became Deputy Surgeon General of the Army on October 1. He succeeded Maj. General Thomas J. Hartford who retired on September 30.

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Around the World

(Ser. IV, No. 10)

By

CLAUDIUS F. MAYER, M.D.

JAPAN and the Japanese have experienced profound changes in recent history. The formerly feudalistic and autocratic country has become a democratic state. Since the *reorganization of Japan* was initiated and controlled by external forces, it was inevitable that the principles of the new system of government remained foreign to a majority of the Japanese, and that *cultural and ideological conflicts* and problems have developed. The twentieth century development of science and technology had also contributed to the basic changes in the structure and function of the Japanese society. Thereby, conflicts arose between different age groups, between men and women, between employer and employee. All these conflicts culminate in *problems within the Japanese family*, which, with its traditional orientation toward authority, gets in constant collision with the contemporary social relations in view of their universal tendency of equalization. The contrast between the two basic structures and functions of Japanese society promotes the occurrence of *emotional stresses in the individuals*, whose efforts at conscious or subconscious suppression of their resentments are more and more often leading to tensions, cynicism, pessimism, even to neurosis and psychosis.

The effect of complex and rapid social changes in the human relations in Japan, especially in the traditional family life, is best illustrated by the recent increase in *suicide, elopement, juvenile delinquency*, and sexual offenses among relatively young people in post-war Japan, as a native scholar (Tokuhata) has pointed out. In 1957, about 3% of all deaths in Japan were suicides, at a rate of 24 per 100,000 inhabitants, or ca.60 cases daily. Among these cases, a large number were multiple suicides since in this country suicide is still considered a legitimate and honorable solution of extreme emotional difficulties. The increasing trend of elopements (23,000 in 1957 vs. 13,000 in 1956 in Tokyo alone) points to the growing conflict between older and younger generations.

Soon after World War II several surveys were made by the Ministry of Health and Welfare which tried to get a clear picture of the *spread of mental disturbances in Japan*. In 1952, a sampling survey showed that psychiatric disturbances in Japan had an average length of 106 days per patient. In the mental hospitals (148) the total number of inmates had been 20,000 ten years ago. By the end of 1955, the number of mental asylums almost doubled (260), with a total capacity of 44,250 beds. The 1952 survey showed that among the patients who were admitted to mental hospitals, 54% had the diagnosis of schizophrenia, 12% were suffering from syphilitic psychosis including general paresis, 11% were manic-depressive, and the rest included toxic psychosis, psychoneurosis, epilepsy, involutional psychosis, mental deficiency and psychopathic personality.

The *actual incidence of psychosis* in Japan is not known, but the ratio must be somewhat smaller than in the U. S. In 1954, a sampling census, which extended over 100 census districts out of a total of 3690, permitted the conclusion that 1,300,000 persons are mentally sick among the 88 million Japanese for that year. This gives a rate of 15 per thousand of the general population. Again by some recalculation, it is thought that 450,000 of these mentally sick people were actual psychotic cases; 580,000 were mentally deficient, while the others suffered from other forms of mental disorder. Out of the total number of mentally affected, only 3% were in institutions. Among them, 9 out of 10 did not receive any kind of

treatment. All these figures suggest that the number of psychotics in Japan is much higher, but many cases are either absorbed by the family, or they remain unidentified. In a country such as Japan, which has a growing population pressure, a limited space and limited natural resources, and where the inhabitants are exposed to dynamic rapid social changes, the fostering of the *mental hygiene movement* is of great importance.

The mental health movement has become important also for the nearby *Philippine Islands* where the rapid social and economic changes and the disruption of the old fashioned family structure had also upset the harmonious relations between parents and children. The occidental type of civilization was here also followed by neurotic difficulties and complications. Leaders of the Philippines recognized the danger, and asked the World Health Organization for help for improving the country's mental health services. Now, the Philippine *National Mental Health Hospital* has been modernized, mental health workers are trained, in the provinces mental health clinics are set up, and, already 10 years ago, the *Mental Health Association* was founded. The membership of the association now includes many thousands, among them psychiatrists, pediatricians, educators, and other professional people. The association runs guidance clinics at Manila and in two provincial cities. There is also a mobile mental health clinic which serves the needs of the Manila schools.

We all read about a French king's hemorrhoids which played such an important role in the history of France and of the world. The *diseases of leaders and commanders* are sometimes of serious consequence to the fate of countries and continents. Though this seems to be a generally acknowledged fact, very little is said about it or written about it in the medical or military literature. A recent study (L'Etang) in the medical press pointed out the fateful events on the history of *the last two wars,* and the possible connection of these events with the physical disability or temporary sickness of responsible leaders. Thus, in the First World War, Sir *John French,* 62 year-old Chief of the Expeditionary Forces, suffered a coronary, and, in spite of medical advice, he did not relinquish his command for a whole year. Many generals at the Gallipoli adventure were also in a deplorable condition of health. One of the leading French commanders was a tuberculous colonel who in 1917, at the offensive of Nivelle, wished to die gloriously. His impatience caused 15,000 deaths, 60,000 wounded, and the disappearance of 20,000 soldiers. According to Goering's revelation at the Nürnberg trials, *Hitler* himself had deliberately provoked the World War II in 1939 because he had thought that a stomach cancer would not leave enough time for him to fulfill his mission. Another example of sick leaders and confusions caused by them is that of Sir *Allan Cunningham,* head of the British 8th Army in the African desert in 1941, whose smoking habit was the cause of an optic neuritis; when his doctor prohibited his further abuse of the tobacco, he became tense and upset, which happened just before the offensive. In his nervous tension, he asked permission to retreat, but, instead of this, he was relieved of his command. Further examples could be listed. Unfortunately, medicine does not have any sure design by which the real fitness of an individual could be determined. The small deficiencies, which are the forecasting signs of major break-downs, are often difficult to assess; on the other hand too much attention is paid to such rough tests as the blood-pressure determination. The chronological age is not a safe indicator of a man's abilities either. Yet, it is sure that the health of the top military commanders is of at least as great importance as the health of the President, or of the pilot of a commercial airplane.

One of the greatest human experimentations has been going on for years in relation to the *prevention of dust diseases in*

miners, especially of silicosis. The human experiments were preceded by studies of the prophylactic effect of certain substances in animals. In 1937 it was shown that aluminum dust added to quartz dust prevented the silicosis in experimental animals. Later, laboratory tests proved that aluminum and some of its compounds have this protective action, whether given intravenously or by inhalation. On the basis of such evidence, on 1 December, 1943, *aluminum powder* was introduced as a measure to prevent silicosis at the Canadian McIntyre Mine. The method which the management introduced at that mine was the dispersal of less than 5 microns of aluminum powder into the atmosphere of a tightly sealed change-room. By November 1945, the method was in use in 39 gold mines in Ontario and in 38 gold, silver, radium and base metal mines in Quebec, the Northwest Territories, Manitoba, British Columbia, the United States, Mexico, and the Belgian Congo. In 1946, the *prophylactic use of aluminum* powder was started with the Cornish tin miners by the Medical Research Council of Great Britain. The cost of such prophylaxis is $1.00 per year per worker in dust exposure. In 1959, the aluminum prophylaxis of silicosis was in use in all but one of 29 gold mines in Ontario; it is also used in 7 of 9 uranium mines in the Blind River camp. The number of miners taking this preventive measure was 10,182. Records of the Canadian Workmen's Compensation Board show that no miner who took the prophylaxis and who mined only in Ontario had developed radiological silicosis (up to the end of 1958). Nevertheless, one has to wait another 15 to 20 years to draw final conclusions about the true preventive value of aluminum powder against silicosis, and about whether it is worth while to take the risk of the occasional harmful effects of aluminum dust.

With the newly acquired independence of the African states, and with the turbulent events in the recent past, the attention of many people in the world is concentrated upon Africa and its various problems. One of these problems is African food and agriculture. At a recent African Regional Conference held at Lagos, Nigeria, the Director-General of FAO (*Food and Agriculture Organization*) showed that *Africa faces four main problems* in this field: the population is growing as fast as, or faster than, the food supplies; African diets are low in nutritional value, deficient in calories, and especially deficient in animal proteins; African exports are meeting increased competition on world markets; and the region as a whole has suffered a lack of knowledge and skills and of finance to invest the needed manpower and capital in development.

Reports from the *Kaduna Military Hospital in Northern Nigeria* indicate that the infant mortality rate among the families of the Nigerian troops and the Nigerian Police is comparable to that of the United Kingdom in Miss Nightingale's day. Of 1000 children born in rural areas, where 95% of the population live, 400 do not reach the age of five. The Kaduna Military Hospital is small; it has 30 medical beds in one ward, a separate ward of 17 beds for officers and their families, and another family ward of 14 beds and cots. There are also 8 beds for infectious diseases, and 4 each for tuberculosis and leprosy, usually occupied. The laboratory is equipped to deal with all routine bacteriological, hematological, biochemical and histological demands. There is an electrocardiograph, and a modern X-ray machine, with facilities for screening and for tomography. In the family ward, acute respiratory illness forms the largest group. Many pneumonias are seen; lung abscess and empyema occur. There is a small number of diarrheal diseases, while otogenic meningitis and amebic infection are frequent. Anemia causes many admissions, while poliomyelitis is rare.

Among the *troops in Nigeria,* respiratory illness and diarrhea are common, and intestinal worms and filariasis occur. Obscure fevers are frequent. Schistoso-

mosis is very frequent and may lead to chronic urinary infection. Hypertension is also frequent, while peptic ulcer has a smaller incidence. Trypanosomosis is rare, and malignant tumors are uncommon. Kaduna also has a general hospital, and for medical consultation the staff of the Ibadan University College Hospital is called. Surgery in these hospitals is just about the same in patients' composition as elsewhere, yet some *problems peculiar to Africa may* arise. There may come a case where a femoral fracture is complicated by snakebite; or, a child may be brought in whose face is practically bitten off by a hyena. Hernia and hydrocele are particularly common, but appendicitis is rare in the African. Burns are very common, and the exposure treatment is very suitable here, since weeping surfaces become dry in a matter of hours. Salpingitis is very common. The number of cystoscopic examinations is on the increase, worms cause various surgical emergencies, but for guinea-worm there is nothing better than the old method of twisting the worms on a stick.

In Northern Nigeria, which is about 280,000 square miles and has a population of 19 million, the *largest town is Kano,* with 150,000 inhabitants. The city has been a center of commerce for a thousand years, and it was always used as a base for camel caravans crossing the Sahara. The city is surrounded by an 11-mile long mud wall. Kano is 12° N of the equator, with a typical tropical climate; the rainy season starts in April and stops in September. The majority of the Northern Nigerians are Hausas, and many of them are Moslems, having their emirs, with the ancient traditional customs and power.

Kano city, which now has an international airport, was selected for the construction of a *modern orthopedic hospital.* In 1958, an orthopedic team, which was sent from England, started to function in the city hospital. The team had to face various difficulties, among which one was the reluctance of the Northern Nigerian to go to any hospital. The newly built Kano Orthopedic Hospital was officially opened 21 December, 1959. The present policy is that only the uninfected orthopedic cases and tuberculosis will be treated in the new hospital. It will also have an educational function, because the plan is that Nigerians themselves should take over the running of their own medical services. Of course, this will take many years.

Among the *clinical material of the Kano hospital,* the traumatic cases amount to about 30%. Tibial fractures are very common, while meniscus injuries and intervertebral disc injuries are very uncommon. The Nigerians are stoical, and therefore they will walk soon after fractures of the pelvis or after crush fractures of the vertebral bodies. A frequent complication of simple forearm fracture in children is gangrene of the hand due to pressure from wooden splints applied by unqualified practitioners. One of the most important and distressing surgical problems in this African country is *tropical ulcer,* usually on the leg. The pathology is still not understood properly. A minor abrasion of the leg becomes infected, and the infection spreads, involving the whole circumference of the limb, causing gross fibrosis, contracture of the underlying muscles and tendons, sometimes periostitis, with persistent purulent discharge, ultimately ending (after about 10 years) in formation of an epithelioma, and other complications, even in deformities of the leg. Acute osteomyelitis is common, while bone and joint tuberculosis, though common, is not a large problem. Congenital dislocation of the hip is almost unknown here, and rickets seldom occur, but genu valgum is extremely common. Rheumatoid arthritis is exceedingly rare. Osteoarthritis is not seen often, because many people who suffer from it do not go to the hospital, accepting the stiff joints and aching as a consequence of growing old.

Medical and health service for the Polish miners is very well developed. The

Mining Health Service of Poland extends to over 330,000 persons. Each coal mine in Polish Silesia has its own medical dispensary which is basically for internal diseases, but it also includes offices for such specialties as surgery, laryngology, neurology, rheumatology, and so on. There is usually a room for dental work, also rooms for laboratory work, x-ray diagnostics, and for physiotherapy. In addition to the medical dispensaries in the mines, the sick miners will also be admitted to the general hospitals and sanatoria, and to the so-called sick-homes. These dispensaries and sick-homes keep a staff of 350 medical doctors (50% specialists) working, together with 130 dentists, 466 nurses and dozens of feldshers and laboratory technicians. Coal-miners like to visit their doctors, in addition to the *annual obligatory physical examination*. Due to the gradual improvement of health service for the miners, the rate of occupational sickness is being gradually reduced. While in 1958, the rate of sickness from silicosis was 9 days per 1000 miners, in 1959 this rate dropped to 7.1 per 1000. The rate of rheumatoid diseases was 89 days per 1000 miners in 1958, and only 65 days in 1959. *Mining Medicine* in Poland has been recently made into a separate organizational division in many regional health departments (e.g., at Katowice), and special regional mining medical dispensaries also have been organized, with closer relation to existing hospitals, and with supervisory power over the local miners' dispensaries. This will make possible a planned sanitation of the mines, and the introduction of personal protective devices, such as, e.g., gloves for the prevention of cutaneous cancer in the miners.

The director of the *Marriage Guidance Council of Victoria* (Australia) is a medical man. Recently, he summarized his experience in this work, gained during the past 30 years, though such consultations cannot be rigidly standardized or stereotyped. What is offered in such a guidance will depend on the apparent needs of the candidates, and the attitude, ability and experience of the doctor. The guidance actually includes three steps: history taking, examination, and treatment. The history-taking will reveal occasional ignorance in sexual matters, and misinformation about the whole subject. The examination should be *general, genital and genetic*. The treatment should consist largely of discussion of any matter that the candidates may wish to talk about, although they should be encouraged to express their ideas and feelings. The usual topics concern heredity, potency, fertility, advisability of the marriage, family planning and sexual relationships in marriage. In no way should the doctor do harm to the person's religious convictions who is seeking guidance by him.

One of our Australian colleagues (Radford) again reminds us that *modern medical research* does not necessarily mean highly-equipped laboratories, with white-coated workers, supported by grants from national research councils. Modern medical research also include clinical research, which can be done at the patients' own homes, and in the family doctors' consulting rooms. A *general practitioner* is dealing with the complete spectrum of disease. The general breadth of his work provides him with the best opportunity to study certain aspects of the disease. He is working in vivo, not in vitro. One of the widest fields open to him is the study of the hereditary factors in the pathogenesis of disease. One kind of research that he can do is the reassessment of traditional methods of treatment, with the newly advertised remedies. It is more sensible for him to evaluate the new drugs in a scientific manner than to use them just because they were advertised or were left with him by an enthusiastic salesman . . . *Multa paucis!*

NOTES

Timely items of general interest are accepted for these columns. Deadline is 1st of month preceding month of issue.

Department of Defense

Deputy Ass't Sec'y of Defense (Health and Medical), Off. Ass't Sec'y of Defense for Manpower—FRANK B. BERRY, M.D.

TO THE EDITOR:

I am writing you in reference to a note appearing on page 570 of Volume 126 No. 7 titled "Drugs From Overseas."

The implications contained therein, indicating the military medical departments have countenanced the purchase of cheap inferior drugs, the expenditure of funds unwisely, and have absolved themselves from all responsibility in connection with the Military Medical Supply Agency requires explanation, if not rebuttal.

The Military Medical Supply Agency, which is a wholesale medical materiel management activity, is headed by a non-medical person. Fifty percent of the key military personnel are provided by the Navy Supply Corps; the balance are drawn approximately one third each from the Army, Navy and Air Force Medical Service Corps. This agency is concerned with and is responsible only in the sphere of materiel management, and is governed and operates in accordance with policies applicable to all military materiel, including medical. Even if the Agency were commanded by a member of the medical service he would still be bound by Armed Services Regulations based on pertinent public laws.

Military medicine was not remiss when it permitted material management concepts to encompass medical materiel; we made certain that medical professional-technical responsibilities would be properly exercised by the Surgeons General. No item of medical supply enters or is deleted from the supply system without approval of the professional staffs; military and essential characteristics of all items are established by medical men; and no substitutions of one item for another are permitted unless authorized by the Surgeons General.

In connection with foreign procurement of drugs, this was initiated for one particular antibiotic whereon price quotations from domestic producers appeared unreasonable. When such a situation prevails it is incumbent on the Government procurement activity to develop other sources of supply from which it can obtain quality items at reasonable and competitive prices. Bids were solicited from foreign suppliers, and a quotation received which was less than one half that quoted by the lowest domestic bidder. Before purchase was made, however, two significant evaluations were effected. First, the foreign bid was analyzed to assure compliance with Executive Order 10582, The Armed Services Procurement Regulations, and Navy Procurement Directives. Second, the materiel Agency sought the views of the Surgeons General, and was advised that foreign material was acceptable if it met the quality standards specified by military medicine and was certified by the Food and Drug Administration. FDA in turn stated foreign firms could be approved for the production of certifiable antibiotics. They further stated that if a contract was entered into, FDA personnel would proceed at suppliers expense to check plant facilities, procedures, quality control, and personnel; and that once the supplier was approved by FDA, he would be required to send samples of each batch to FDA in Washington for certification. This procedure has been followed for all subsequent foreign procurements.

Inspection and testing of foreign drugs has been more stringent and detailed than is applicable to the well-known domestic suppliers. It would appear that at least some of the foreign firms are well able to produce acceptable drugs; I noticed, for example, in the report of the hearings of the Senate Subcommittee on Antitrust and Monopoly that one large American firm stated it bought semi-raw material abroad for domestic packaging in capsule form.

I believe that the foregoing clarifies the military medical position relative to the procurement of foreign drugs. We have not, nor do we intend that cheap drugs of low quality be permitted to enter into our supply system to the detriment of military medical care.

Sincerely yours,
FRANK B. BERRY, M.D.
Deputy Assistant Secretary
(Health and Medical)

MEDICAL COUNCIL

The Civilian Health and Medical Advisory Council established by the Secretary

of Defense to advise the Assistant Secretary of Defense (Manpower) on health and medical matters met recently in Washington.

Members of the Council are: Dr. Frank B. Berry, Deputy Assistant Secretary of Defense (Health and Medical)—Chairman; Dr. Kenneth B. Babcock, Director of the Joint Commission on Accreditation of Hospitals, Chicago; Dr. John C. Brauer, Dean of the School of Dentistry, University of North Carolina, Chapel Hill; Dr. B. Noland Carter, Professor of Surgery Emeritus, Cincinnati; Dr. Michael E. DeBakey, Professor of Surgery, Baylor University College of Medicine, Houston; Dr. Champ Lyons, Professor of Surgery, University of Alabama, Birmingham; Dr. Joseph F. Sadusk, Chairman of the Medical Legal Committee, California State Medical Association and former Executive Secretary of the Research and Development Board, Oakland.

DOCTOR DRAFT

The need for physicians and dentists in the military services is obvious. An increased need for them when there is an increase in the size of the Armed Forces should likewise be obvious. So unless there are volunteers for active duty there is only one other way to meet the need. That is by a doctor draft. Volunteers for extension of duty will likewise aid the need.

This matter is constantly under study by the Department of Defense. The Office of Assistant Secretary of Defense for Manpower which has as its Deputy for Health and Medical matters Doctor Frank B. Berry, is working closely with the American Medical Association and the American Dental Association toward a solution of this need for physicians and dentists for the Armed Forces.

MEDICARE ASSIGNMENT

Colonel John H. Kuitert, MC, has been assigned to the Office for Dependents' Medical Care (Medicare) as Professional Director.

He is a native of Michigan and received his medical degree from George Washington University School of Medicine in 1935. He inaugurated the Army's first coordinated Physical Medicine Service when the new Tripler General Hospital opened in Hawaii in 1948. He has served with the Canadian Department of National Defense as Medical Technical Liaison Officer. His last assignment was as Post Surgeon, Fort Lewis, Washington.

AFIP ANNOUNCES COURSES

Following is the Postgraduate Short Course Program planned by the Armed Forces Institute of Pathology for Fiscal Year 1962:

Application of Histochemistry to Pathology	Oct. 16-20, 1961
Introduction to Research Method	Oct. 23-27
Forensic Pathology	Jan. 15-19, 1962
Annual AFIP Lectures, 1962	Feb. 12-16
Pathology of the Oral Regions	March 12-16
Ophthalmic Pathology	April 2-6
Forensic Sciences Symposium	May 8-10

Army

Surgeon General—LT. GEN. LEONARD D. HEATON

Deputy Surg. Gen.—BRIG. GEN. HOWARD W. DOAN

ADVISORY COUNCIL TO MEET

The Surgeon General's Advisory Council on Reserve Affairs will meet in Washington, November 4 and 5.

Heading the Council, composed of general officers of the Medical and Dental Corps Reserve, is Brig. General Frank E. Wilson. Members are: Brigadier Generals Truman G. Blocker, Jr.; Joseph M. Bosworth; Thomas P. Fox (Dental); Carl S. Junkermann; James H. Kidder; John B. Lagan; Harold G. Scheie.

It is anticipated that the nomination of new members, to bring this Council back to its authorized strength of eleven General officers, will be acted upon at this meeting.

ASSIGNMENTS TO SGO

The following assignments have been made to the Office of the Surgeon General of the Army:

Colonel Oswald M. Weaver, MC, as Chief of Psychiatry and Neurology. He succeeds Colonel Albert J. Glass who is now Consultant in Neuropsychiatry to the Chief Surgeon, U. S. Army, Europe.

Lt. Colonel Charles F. McAleer, Jr., MSC, as Assistant Chief of the Hospital Management Engineering Branch, Directorate of Plans, Supply, and Operations.

Major Raymond E. Adams, MSC, Chief Special Studies Section, Directorate of Plans, Supply and Operations.

Major Clyde C. Eddinger, MSC, to Plans Branch, Directorate of Plans, Supply and Operations.

Major Robert C. Ferm, MSC, detailed to Inspector General of the Army and assigned to Surgeon General's Office.

Major Iladene H. Filer, ANC, to Office of the Special Assistant for Reserve Affairs. She succeeds Major Margaret A. Ewen who has been ordered to the Brooke Army Medical Center.

Major Frederick J. Goebeler, Jr., MSC, to Hospital Management Engineering Branch, Directorate of Plans, Supply and Operations.

HEALTH FACILITIES

Aberdeen Proving Ground, Maryland, is the site chosen for the first Health Facility in the Army. Ground-breaking ceremonies were held there recently.

This $3 million structure, scheduled for completion in September 1963, is a new concept in a medical establishment in the Army. Patients are treated on an outpatient basis where possible rather than ordered into the hospital. Even if hospital treatment is needed for an elective surgery case much of the laboratory work can be done on an outpatient basis. This saves hospital days and patients can carry on their duties while study of their case progresses.

The new facility at Aberdeen Proving Ground will be a three-story brick building with a total floor space of 84,000 feet and 75-bed capacity. The first floor will house twelve clinics and diversional therapy facilities, including Red Cross, Auditorium, and Post Exchange.

The second and third floors will be occupied by nursing units, operating rooms and a delivery room. The nursing units will consist of 31 surgical beds, 16 general medical, 16 maternity, and 12 pediatric.

The building will have elevator service, air conditioning, and central television, oxygen, public address and dictation systems.

NURSES NEEDED

The Surgeon General of the Army has indicated the need for 500 nurses in view of the expansion of the Army. There is a hope that many will volunteer for active duty.

Those interested may apply at any Army hospital in their vicinity, to Army area headquarters: Governors Island, N.Y., Fort Meade, Md., Atlanta, Ga., San Antonio, Texas, Chicago, Ill., and San Francisco, Calif., or write to the Office of the Surgeon General of the Army, Washington, D.C.

PHARMACISTS

Vacancies exist in the Army for graduate pharmacists. Those between the ages of 21 and 33 may be appointed as officers in the Medical Service Corps Reserve and ordered to active duty for a period of three years.

Interested pharmacists should apply to The Surgeon General, U. S. Army, Washington 25, D.C., Attn: MEDPT-MP.

STUDENT AID IN OCCUPATIONAL THERAPY

Women junior and senior students can enroll in the new program (with pay) designed to fit them for occupational therapists. They must be between 18 and 28 years of age, unmarried, and be a full-time student in an accredited college with a course in occupational therapy included in the study program. There is an obligated service after graduation.

Application forms are available from the Army Medical Specialist Corps Procurement Counselor in each of the Army areas or from the Office of the Army Surgeon General (Attn: MEDPT), Washington.

PL 87-142 AUTHORIZES COMMAND

Medical Service Corps officers will be permitted to command troops that are not part of the Army Medical Service when authorized by the Secretary of the Army. The recently signed legislation gives this authority.

These assignments cover such fields as research and development, supply, intelligence, Military Assistance Advisory Groups, military missions, and Army aviation, as well as the Army General Staff.

DIRECTOR AND COMMANDANT, WRAIR

Colonel Conn L. Milburn, Jr., MC, USA, recently Executive Officer of Walter Reed General Hospital, is the new Director and Commandant of the Walter Reed Army Institute of Research, Washington. He succeeded Colonel Richard P. Mason, who has retired and is now vice-president and director of research for the American Cancer Society.

U. S. Army Photo

COL. CONN L. MILBURN, MC, USA

He is a graduate of Tulane University School of Medicine, has a master's degree in hospital administration from Baylor University and the degree of Master of Public Health from the Royal College of Physicians and Royal College of Surgeons, England and Scotland. He is a diplomate in the American Boards of Pediatrics and Internal Medicine and a Fellow in the American College of Physicians.

HOSPITAL ADMINISTRATION RESIDENCY

At Walter Reed General Hospital three Medical Service Corps officers have begun a year-long residency in Hospital Administration. They are: Lt. Colonel Fernando

U. S. Army Photo

(L. to R.): Col. Albert B. Hunt, Lt. Col. Fernando Rojo, Capt. Henry P. Doble, and Major Wade H. Dexter.

Rojo, Major Wade H. Dexter, and Captain Henry P. Doble. Their Residency Preceptor is Colonel Albert B. Hunt, Comptroller of the Walter Reed Army Medical Center.

The end result of the program is a masters degree in hospital administration following the satisfactory completion of the residency.

PHARMACY RESIDENCY

Captain James W. Stover completed the second half of the Army's new pharmacy residency program at Walter Reed General Hospital recently.

He is one of the first two residents in hospital pharmacy. He has received a Cer-

tificate of Hospital Pharmacy Residency from the Commanding General of Walter Reed General Hospital, Major General Floyd L. Wergeland. In addition he received the degree of Master of Science in Hospital Pharmacy from the University of Michigan.

He has been ordered to the Medical Field Service School, Brooke Army Medical Center, Fort Sam Houston, Texas.

CHIEF OF PEDIATRICS, WRGH

Major Edward J. Tomsovic, MC, USA, has been designated Chief, Pediatrics, Walter Reed General Hospital. He succeeds Colonel Ogden C. Bruton, retired, who has joined the Student Health Service, University of Maryland.

DENTAL INTERN

The first woman dental intern, of the Army, First Lieutenant Alba F. Zanin, has begun her training at Walter Reed General Hospital. She is the second woman member of the Army Dental Corps.

DIRECTOR AMRL

Colonel Fred D. Maurer, VC, has been named Director, Pathology Division, U. S. Army Medical Research Laboratory, Fort Knox, Ky.

Colonel Maurer, a native of Idaho, is an international authority on viral diseases of domestic animals of economics importance in Africa and the Near East. He recently spent two months working with African Horse Sickness in the Middle East where serious losses have been caused by this disease.

AT BAMC

Colonel William S. Moore, MC, has taken over command of the U. S. Army Medical Training Center at Brooke Army Medical Center, Fort Sam Houston, Texas.

Colonel Edwin S. Wallace, MC, has been appointed Executive Officer, Brooke Army Medical Center. This is the same position that he held from 1953 to 1958 at which time he left for Puerto Rico to become Commanding Officer of Rodriquez Army Hospital.

WELLCOME MEDAL WINNER COMMANDS HOSPITAL

Lt. Colonel Samuel Hurewitz, Medical Corps, who won the Sir Henry Wellcome Medal awarded by the Association of Military Surgeons in 1959, now commands the 250th General Hospital at Brooke Army Medical Center.

He served in five campaigns in World War II and with the 40th Division in Korea where he participated in three campaigns. He is a senior parachutist.

HONORED

Colonel Maurice J. Fletcher, MSC, USA, recently retired, received the Golden Plate Award of The Academy of Achievement at Monterey, California, September 9.

Colonel Fletcher was recognized for his work in the field of prosthetics and artificial limbs. He has taken up residency at Ely, Minn.

BECOME PROFESSORS

Colonel Humbart L. Riva, long time chief of obstetrics and gynecology at Walter Reed General Hospital, has retired from military service to be professor and chairman of the department of obstetrics and gynecology at Seton Hall College of Medicine, Jersey City, New Jersey.

Dr. Kenneth Judy, Colonel USAR and commanding officer of the 322nd General Hospital Kearny, New Jersey, and a Consultant Surgeon, Armed Forces, has been named professor and chairman of the department of surgery at Seton Hall College of Medicine.

RETIRES

Colonel Alfred R. Cannon, MSC, USA, who has been Military Assistant for Materiel in the Office of the Deputy Assistant Secretary of Defense (Manpower—Health and Medical) was awarded the Legion of

Merit at the time of his retirement recently.

Navy

Surgeon General—Rear Adm. Edward C. Kenney

Deputy Surgeon General—Rear Adm. Allan S. Christman

SELECTED FOR REAR ADMIRAL

Captain Robert B. Brown, MC, USN, Commanding Officer, U. S. Naval Hospital, Bethesda, Md., has been selected for promotion to the rank of Rear Admiral.

He is a graduate of the University of Pennsylvania School of Medicine (1933). He interned at the Hospital of the University of Pennsylvania from 1933-35. In 1941 after six years of fellowship he received a Doctor of Science (in surgery) from that University. In February 1942 he entered on active duty with the Medical Corps of the Navy and has served continuously since.

ASSIGNMENTS TO BUMED

Captain John G. Esswein, MC, USN, has been assigned as Medical Member Physical Review Council, Bureau of Medicine and Surgery, Department of the Navy.

Lieutenant Commander Theodore H. Conaway, Jr., MSC, USN, has assumed duties as Head, Mobilization Planning in the Planning Division of the Bureau.

Lt. Floyd H. Anderson, Jr., MSC, USN, has assumed duties as Assistant in the Fiscal and Supply Systems Branch of the Bureau.

Lt. (j.g.) Eugene R. Keller, MSC, USN, has assumed duties as Executive Assistant to the Inspector General, Dental.

COMMANDS NMRI

Captain John R. Seal, MC, USN, has assumed command of the Naval Medical Research Institute, National Naval Medical Center, Bethesda, Maryland.

He just recently returned from command of the Naval Medical Research Unit (NAMRU) #3, Cairo, Egypt.

Official Photo U. S. Navy

Capt. John R. Seal, MC, USN

Doctor Seal, a native of Charleston, West Virginia, is a graduate of the University of Virginia School of Medicine (1937). Just prior to entering military service in 1942 he was an instructor in medicine, Cornell University School of Medicine.

He is a life member of the Association of Military Surgeons of the United States and was the first recipient of the Stitt Award which honors the late Rear Admiral Edward Rhodes Stitt, a Surgeon General of the Navy who made outstanding contributions to tropical medicine.

Doctor Seal is certified by the American Board of Internal Medicine and is a Fellow of the American College of physicians, Member of the American Medical Association, and Alpha Omega Alpha Honorary Medical Fraternity.

RETIRED

The following Medical Department Officers have been retired from the Navy: Captains Kenneth K. Bridge, DC; Rush L. Canon, DC; D. F. Stagner, DC; Commander Woodrow C. Manley; Lieutenant Commanders Carl E. Jackson, Clyde B. Segars; Lieutenant Joseph G. DiCarlo.

Air Force

Surgeon General—MAJ. GEN. OLIVER K. NEISS
Deputy Surg. Gen.—MAJ. GEN. RICHARD L. BOHANNON

BODY TEMPERATURE

An Air Force sergeant clothed only in shorts was subjected to decreasing temperatures at the Arctic Aeronautical Medical Laboratory, Fairbanks, Alaska. His skin temperature was determined as the air temperature was reduced. Recordings were made in two different ways: by thermocouple and by infra red photography.

From 80°F down to 40°F, skin temperature of the subject cooled relatively slowly, requiring approximately one hour. At 40°F the cooling rates increased sharply.

It was found that infra red photography gave more detailed data on the areas of the body. Results indicated that the rate of heat loss is higher at the armpits, spinal column, knees and elbows. When the subjects are fully clothed, the head acts as a wick with considerable heat flow through it, and great heat transfer occurs at the collarline.

Some of this detailed data is necessary in the development of Arctic clothing.

Public Health Service

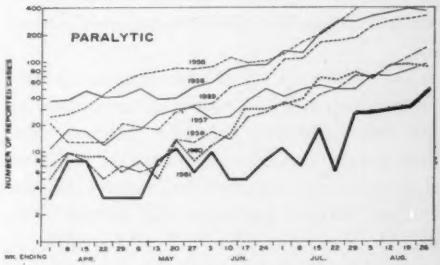
Surgeon General—LUTHER L. TERRY, M.D.
Deputy Surg. Gen.—JOHN D. PORTERFIELD, M.D.

ORAL POLIO VACCINE

A license to manufacture live, oral, Type I polio vaccine, as developed by Dr. Albert Sabin of Cincinnati, has been granted to Pfizer, Ltd., Sandwich, England. The vaccine will be marketed in the United States by Chas. Pfizer & Co., Inc., of New York.

Dr. Luther Terry, Surgeon General of the Public Health Service said: "I want to emphasize that an oral vaccine providing protection against all three types of poliomyelitis will *not* be available for some time. The vaccine being licensed produces immunity only against Type I polio. Therefore, it is of the highest importance that vaccinations continue with the Salk vaccine which is the only weapon we have today to provide protection against all three types of polio."

Of the three types of poliovirus, Type I has been responsible in recent years for between 60 and 70 percent of all paralytic polio in this country. However, a sampling of virus isolations from paralytic cases this year suggests that Type III may be increasing in relative importance as a cause of paralytic disease. The Public Health Service has purchased 900,000 doses of the oral vaccine. This will be held in reserve at the Communicable Disease Center, Atlanta. A community threatened with a polio epidemic can request the vaccine through its State Health Department if at least three cases of polio have occurred in a month, two of which have been proved to be Type I.



Current U.S. Polio Incidence compared with years 1955-1960, April-August; new cases reported for week shown.

ASSIGNMENTS

The following assignments have been made in Medical Officers in Charge of U. S. Public Health Service Hospitals:

Dr. Daniel J. Daley, Staten Island, N.Y. He succeeds Dr. John N. Bowden, retired.

Dr. John F. Oesterle, Baltimore, Md. He has been in charge of the hospital at Mount Edgecumbe, Alaska.

Dr. Henry D. Smith, Boston Mass. He succeeds Dr. A. A. Doerner, retired.

Dr. Milo O. Blade, Galveston, Texas.

Dr. John A. Trautman, New Orleans. He succeeds Dr. John L. Wilson, retired.

DIRECTOR OF HEALTH SERVICES

Dr. James K. Shafer has been designated as Director of Health Services in the reorganization of civil defense offices. The Office of Civil Defense Mobilization is being reorganized as the Office of Emergency Planning. Part of the responsibility of the former office is being transferred to the Secretary of Defense.

Dr. Shafer has been head of the Division of Community Health Practice, U. S. Public Health Service.

DR. DEARING RETIRED

Dr. W. Palmer Dearing who has been Director of Health Services for the Office of Civil and Defense Mobilization since 1957 retired from the U. S. Public Health Service with more than 25 years service. He was Deputy Surgeon General from 1948 to 1957. He is to become Executive Director for Group Health Association of America.

The Office of Civil and Defense Mobilization has been reorganized and many of the responsibilities for civil defense have been placed under the Secretary of Defense. Responsibility for medical aspects of the civilian defense program will remain with the U. S. Public Health Service which is under the Department of Health, Education, and Welfare.

INDEX-CATALOGUE

Known as "The Surgeon General" Index-Catalogue which was started many years ago, the work will soon be brought to termination with this Fifth Series. Volume 2 is off the press, and by the time this issue of MILITARY MEDICINE is published the last volume should be completed. The complete Fifth Series is available from the Government Printing Office, Washington, for $17.25.

This project was conceived almost a century ago. It has been a monumental work comprising 61 volumes with the completion of the Fifth Series. This work was all started by Army Medical Officers. Several years ago, what was then known as the Armed Forces Medical Library, an outgrowth of the Army Medical Library, was transferred to the U. S. Public Health Service. The institution is now known as the National Library of Medicine.

NATIONAL LIBRARY OF MEDICINE

Completion of the new building for the National Library of Medicine which will be at the National Institutes of Health, Bethesda, Maryland, is expected sometime in December 1961, and dedication is scheduled for December 14 and 15.

VIROLOGY BRANCH OF NCI

The Virology Research Resources Branch has been established at the National Cancer Institute, National Institutes of Health, Bethesda, Maryland.

Dr. Kenneth M. Endicott, Director of the National Cancer Institute, describes virus-cancer research as one of the most important newly emerging broad areas of cancer investigation.

The National Cancer Institute has already awarded 175 grants totaling $6.5 million to support virus-cancer research in non-government laboratories in the United States and abroad. In addition, the Institute conducts virus-cancer research in its own Laboratory of Viral Oncology at Bethesda.

DISEASE DETECTIVES

Thirty-two young public health officers, most of them physicians, joined the ranks of the U. S. Public Health's epidemic service recently. They have been given five weeks training at the Communicable Disease Center in Atlanta and then were given stations over the country.

These officers will be on call to investigate epidemics. They will serve for at least

two years, and most of them will thereby fulfill their military obligations.

POISON CENTERS

There are 460 poison-control centers affiliated with the National Clearing-house for Poison Control. The need for these centers is evident when one learns that 600,000 children swallow household aids left within their reach and that about 500 die as a result.

These centers maintain records of ingredients of trade-name products plus antidotes. The information is available to physicians by telephone day or night.

The National Clearinghouse for Poison Control Centers is directed by the Public Health Service, Division of Accident Prevention, headed by Assistant Surgeon General A. L. Chapman, Washington.

MALARIA CARRIER IN MONKEYS

Anopheles hackeri, a mosquito that transmits malaria to monkeys in nature, has been identified and reported for the first time by Dr. R. H. Wharton of the Institute for Medical Research, Kuala Lumpur, Federation of Malaya, and Dr. Don E. Eyles of the Laboratory of Parasite Chemotherapy, National Institute of Allergy and Infectious diseases.

The report was made in the July 28 issue of *Science.*

Investigation is under way to determine if this mosquito can transmit simian malaria to man. Last year Dr. Eyles and his colleagues showed the *Anopheles freeborni* does transmit malaria from monkeys to man. This fact disproved the long held concept that types of malaria infecting lower animals cannot be inoculated successfully into man by the bite of an infected mosquito.

Approximately one-half of the world's population lives in areas exposed to malaria. An estimated 250 million suffer from the disease each year, and of these 2,500,000 die. In the last four years alone, this country has contributed over $100 million in direct support of this international effort.

TETANUS

The 1961 rate for tetanus has shown no decline from the average of 450 cases a year in the United States in recent years. When the disease is contracted more than half of the people die.

Immunization against tetanus should be routine for all children. Persons living in areas were there is special risk of tetanus, or who work in risk-involved jobs, should be immunized.

The public can be made more aware of the disease through a pamphlet (PHS Publication No. 159) which can be procured from the Government Printing Office, Washington, at 5¢ a copy or $2.00 for 100.

INFLUENZA VACCINE

The Surgeon General of the Public Health Service has reported that an upswing in the influenza cycle is likely to hit the United States during the fall and winter.

He recommended vaccination for three groups: persons with heart disease, pulmonary disease, diabetes and other chronic illnesses; persons over 65; and pregnant women.

CALCIUM

At the National Institutes of Health workers have found that diets high in calcium may offset the thinning of bones in arthritis patients treated with cortisone and other corticosteroids.

The work done by Dr. S. Donald Whedon, Dr. Leo Lutwak, and Preston Smith pointed out that in 13 studies hormones increased calcium excretion from the body in eight studies, made no change in two, and decreased its loss in three. The loss could be overcome by the use of milk products, other calcium foods, and calcium lactate tablets.

Veterans Administration

Chief Medical Director—WILLIAM S. MIDDLETON, M.D.
Deputy Chief Med. Dir.—H. MARTIN ENGLE, M.D.

STATISTICS

Veterans in civil life at the end of June 1961 numbered 22,403,000 against the figure of 22,534,000 for June 1960. Of this number 2,565,000 were from World War I, against 2,673,000 for World War I veterans as of June 1960.

The average patient load in hospitals was 113,750 daily as of June 1961, with 206,407 outpatients for that month.

JOINS ATS

Dr. Harry E. Walkup, Assistant Director of Surgical Service, has left the Veterans Administration, Washington, to become Director of Research for the American Thoracic Society, the medical arm of the National Tuberculosis Association.

A native of West Virginia, Dr. Walkup received his medical degree from the University of Maryland. He specialized in thoracic surgery and has done research in pulmonary diseases.

Miscellaneous

GROWING MEDICAL CENTER

San Antonio, Texas, already the site of large Army and Air Force medical facilities, sizeable percentages of which are devoted to training, will have its medical interests increased by the recent acquistion of land for a school of Medicine as a part of the University of Texas.

RECOMMENDED READING

Tops in our estimation is the article "The Will to Win" by Anthony Harrigan, Director, Foreign Policy Research Institute, Charleston, South Carolina, and also Associate Editor with *The News and Courier of Charleston*. A fond hope would be that every citizen would read this article which appeared in the *U. S. Naval Institute Proceedings*, Volume 87, Number 8, pp. 75-79, August 1961.

TELEVISION

Pogo Primer for Parents (TV Division), Children's Bureau Headline Series 2, was prepared by Walt Kelly and "applies concepts of mental health and child rearing embodied in the findings of the 1960 White House Conference on children and youth."

Television is here to stay. How parents and children adjust themselves to it in the homes is a matter of discussion in cartoons of Pogo—50 of them to be exact.

Copies may be obtained from the Government Printing Office, Washington, at 20¢ a copy.

PHENYLKETONURIA

Phenylketonuria (PKU), a little known disease which causes mental retardation in children, will be intensely studied in Wisconsin by the University of Wisconsin Medical Center.

A simple chemical test can determine the presence of PKU. In this study Dr. H. A. Waisman will distribute filter paper to mothers who will in turn place the paper in the babies diapers. The urine wetted paper will be returned to the doctor who will apply the ferric chloride test.

Phenylalanine, the damaging agent, can be detected by the time the infant is three weeks old. Early detection and then treatment by proper diet will prevent brain damage which is characteristic of the disease.

ESSAY COMPETITION

"Goiter—especially its basic cause" is the subject for competitive essays in the Van Meter Prize Award of the American Thyroid Association, Inc. The studies so submitted may relate to any aspect of the thyroid gland in all of its functions in health and disease. The work must not have been previously published.

Essays (not over 3000 words) should be sent to the Secretary of the Association, 430 N. Michigan Ave., Chicago 11, not later than January 1.

INDUSTRIAL MEDICINE FELLOWSHIPS

The Atomic Energy Commission offers fellowships which provide advanced training in the field of Industrial Medicine, particularly in relation to the atomic energy industry.

Inquiries should be addressed to: AEC Fellowships in Industrial Medicine, Atomic Energy Project, University of Rochester School of Medicine and Dentistry, Rochester 20, N.Y.

MEDICAL LECTURES

Illustrated Medical Lectures, each course consisting of a thirty minute audio tape and an accompanying full color 35 mm filmstrip that can be projected on a screen or viewed through a hand or desk viewer, are now available from the Loma Linda University, School of Medicine, Los Angeles, California.

MEETING

The AMA clinical meeting will be held in Denver, November 26-30. On the program are Jonas E. Salk, Warren H. Cole, Max Wintrobe, David M. Bonner, Walter Burdette, Charles H. Roadman, Oliver K. Niess, Hubertus Strughold, and many others.

The American College of Surgeons will hold its first sectional meeting in Los Angeles. This is the only four-day meeting for 1962 scheduled by the College, and the only meeting with a special program for nurses.

Further information may be obtained by writing to the headquarters at 40 East Erie St., Chicago 11, Ill.

CASE FOR DIAGNOSIS (SEE PAGE 772)

The illustration depicts a nonoperculate helminth ovum having a lateral spine and containing a miracidium. This is diagnostic of infestation with *Schistosoma mansoni*.

This blood fluke is distributed throughout the greater part of Africa, Brazil, Venezuela, Dutch Guiana, Puerto Rico, and windward and leeward Caribbean Islands. Intermediate host is the snail.

PEDESTRIAN ACCIDENTS

More than 5000 pedestrians who were crossing the streets were killed in 1960 while more than 165,000 were injured.

FILM AVAILABLE

External Cardiac Massage is a motion picture film designed to give the salient features of this life-saving procedure. The film may be borrowed from Smith, Kline and French Laboratories, 1500 Spring Garden St., Philadelphia 1, Pa.

WHO PUBLICATIONS

Insecticides and Malaria Bull Vol. 24/4-5/1961	$4.00
The Role of Immunization in Disease Control Public Health Papers #8/'61	1.25
Teaching of Psychiatry and Mental Health Public Health Papers #9/'61	2.00
Communicable Diseases Influenza Athropoid-Borne-Staph-Polio-Tbc-Leptospirosis	2.00
Control of Soil-Transmitted Helminths Public Health Papers #10/'61	.60
Gonorrhea, Immunization, Pharm. Prep. WHO Chronicle V 15/8/'61	.30
Programme Development in the Mental Health Field TRS #223/'61	.60
Evaluation of the Carcinogenic Hazards of Food Additives Report of Committee TRS No. 220/'61	.60
Rehabilitation in Leprosy TRS No. 221/'61	.60
WHO Chronicle, Vol. 15, No. 7/'61	.30

Food Additives, psychiatric epidemiology, Spread of disease by birds, etc.

Any of these may be obtained from Columbia University Press, IDS, 2960 Broadway, New York 27, N.Y.

New Members

Cdr. Armand P. Chartier, MSC, USN
Capt. John McCardle, Jr., MSC, USA
LCdr. Owedia Marie Searcy, NC, USN
Cdr. Edward Frederick Haase, MSC, USN
Lt. (jg) Robert K. Isokane, MSC, USNR
LCdr. Allen S. McMichael, MSC, USN
LCdr. Edwin B. Miller, MSC, USN
LCdr. Franklin B. Sleadd, MC, USN
Maj. Stuart H. Walker, MC, USA
Capt. Arthur Henry Berryman, MC, TNG
LT (jg) Bob Andy Jones, Jr., MSC, USN
LCdr Ruth Moeller, MSC, USN
LCdr Jerome Noble, MC, USN
Capt. Arthur D. Schmidt, MSC, USAR
Lt. Col. Albert M. Betcher, MC, AUS
P. A. Surg. Alfred N. Godholm, USPHS, USCG
Capt. Raymond S. Megibow, USAF, AUS
Lt. Col. Irving Rappaport, MC, USAR
Cdr. Hazel M. Grainger, MC, USNR
Capt. Ingram W. Ogden, DC, USN, Ret.
Capt. Alfred M. Alden, MC, USA
Asst. Surg. Robert P. Blereau, USPHS
Asst. Den. Surg. Roger A. Meyer, DC, USPHS
Lt. Lowell B. Tedder, MSC, USN
Major Noklaus J. A. Keller, MC, USA
Capt. Paul H. McFarland, Jr., DC, USA
Cdr. David J. McLellan, MSC, USN
LCdr. Dymphna Van Gorp, NC, USN
Cdr. Karl A. Lofgren, MC, USNR
Cdr. Leo A. Jackowski, Jr., MSC, USN
Lt. David R. Stoop, MC, UAN
Lt. William Franklin Falls, Jr., MC, USNR
Lt. Calvin S. Hembree, MSC, USA
Major Barbara E. Baggs, ANC, USA
Capt. Robert C. Krissinger, USAF, MC
LCdr. Gordon W. Werner, USN, MSC
Lt. George J. Risko, MSC, USN
Capt. Elsie G. Nickel, ANC, USA
Edward Clifford Brennan, USPHS
Lt. Col. Robert N. Cron, MSC, USAR
Cdr. Sidney Gorden, MSC, USN
Gustave J. Dammin, M.D.
Lt. Cdr. Pauline A. Kopec, NC, USNR
LT (jg) Robert F. Moran, MSC, USN
Lt. Henry J. Niepsey, MSC, USN
Ens. B. J. Taylor, MSC, USN
Lt. Col. John Coburn Hill, MC, AUS
Lt. Gerald N. Davis, MC, USN
Col. Howard Walter Baker, MC, USAR
Capt. Margaret I. Lesko, ANC
2/Lt. Philip Reiff, MSC, USAR
Lt. Austin C. Emmerling, DC, USAF
Paul Magalian, VA
Lt. Robert N. Nelson, DC, USA

MEMBERSHIP COMMITTEE

Lt. Col. Nathan Cooper, U. S. Air Force, MSC, Chairman
Mr. George F. Archambault, USPHS
Commander Burdette M. Blaska, NC, USN
Colonel Jesse W. Brumfield, MSC, U. S. Army
Lt. Col. V. Harry Adrounie, USAF, MSC
Mr. Vernon O. Trygstad, Veterans Administration
Lt. Col. Carl J. Schopfer, MC, NJNG

Honor Roll

Since the publication of our last list, the following sponsored one or more applicants for membership in the Association:

Lt. Col. Irvin C. Plough, MC, USA
Cdr. Calvin F. Johnson, MSC, USN
Col. Ellis Arkus, AUS, RET.
Cdr. C. F. Climie, MC, USN
Col. Bernard Aabel, MSC, USA
Lt. Col. George M. Beam, AUS, Ret.
Capt. Carl E. Pruett, MC, USN
John T. Bate
LeRoy E. Burney, M. D.
Vernon O. Trygstad
Lt. Col. David H. Beger, USAF, MC
Cdr. Calvin F. Johnson, MSC, USN
LCdr Paula C. Towle, MSC, USN
LT (jg) George F. Baker, USN, MSC

Deaths

BATES, Lewis B., Colonel, Medical Corps, U. S. Army Reserve, Retired, died August 2, 1961 at the age of 78.

Doctor Bates was a graduate of Tufts University School of Medicine (1906). He specialized in pathology. He had attained the grade of colonel and was retired from the Reserve on June 29, 1948. His residence was 45 Randall Avenue, East Weymouth 89, Mass.

SKELTON, Robert, Colonel, Medical Corps, U. S. Army, Retired, died May 25 at Letterman General Hospital, San Francisco, California, of cancer. His age was 74.

Colonel Skelton, a native of Pennsylvania, received his medical degree from the University of Pennsylvania in 1908. He entered the Army Medical Corps in 1911 and was retired August 31, 1948. He was a graduate of the Army Medical School, the Army War College, and the Army Industrial College. He had been awarded the Legion of Merit.

Colonel Skelton, a Life Member of the Association of Military Surgeons of the United States, had contributed several articles to *The Military Surgeon* (former name of *Military Medicine*).

Following the death of his first wife (Evangeline Bovard), an Army nurse, in 1955, Colonel Skelton established the "Evangeline G. Bovard Award" with a $25,000 fund the income from which is to be used annually as a prize for the nurse (or nurses) at Letterman General Hospital who demonstrates the highest degree of professional competence in maintaining the superior standards of the Army Nurse Corps.

He is survived by his widow, Mrs. Grace Skelton, 1819—16th Avenue, San Francisco 22.

Plan To Attend . . .

- EXCELLENT PROGRAM
- EVENTS FOR LADIES
- AWARDS
- ANNUAL DINNER
- ENTERTAINMENT
- SCIENTIFIC EXHIBITS
- TECHNICAL EXHIBITS
- MOTION PICTURES

ALL ARE INVITED

NO REGISTRATION FEE

RETIREMENT CREDIT POINTS GRANTED

THE 68TH ANNUAL MEETING OF THE ASSOCIATION OF MILITARY SURGEONS OF THE UNITED STATES

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MAYFLOWER HOTEL
WASHINGTON, D.C.

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NOVEMBER 6, 7 AND 8

PROGRAM

68TH ANNUAL MEETING
ASSOCIATION OF MILITARY SURGEONS
OF THE UNITED STATES

Mayflower Hotel
Washington, D.C.

November 6, 7, and 8, 1961

THEME—"INTERNATIONAL MEDICINE—PATH TO WORLD PROGRESS"

PRESIDENT: LEROY E. BURNEY, SURGEON GENERAL, U.S. PUBLIC HEALTH SERVICE, RETIRED

SUNDAY, NOVEMBER 5

1:00-5.00 P.M.—*The Registration Desk will be open for those who may wish to register before the meeting opens.*

MONDAY, NOVEMBER 6

8:30-9:00 A.M.—Band Concert

9:00 A.M.—*Opening Ceremony*

Address by the President of the Association

9:30 A.M.—*Address*

Dr. Thomas Parran, former Surgeon General of the U. S. Public Health Service and Past President of the Association of Military Surgeons—U.S.

Introduction of the oldest Living Past President of the Association Dr. John W. Kerr, U.S.P.H.S., Ret.

10:00-12:00—*Panel of Chiefs of Federal Medical Services*

Dr. Frank Berry, Deputy Assistant Secretary of Defense (Manpower—Health and Medical)

Lt. Gen. Leonard D. Heaton, The Surgeon General of the Army

Rear Admiral Edward C. Kenney, The Surgeon General of the Navy

Maj. Gen. Oliver K. Neiss, The Surgeon General of the Air Force

Dr. Luther L. Terry, The Surgeon General of the Public Health Service

Dr. William S. Middleton, The Chief Medical Director of the Veterans Administration

12.00 NOON—*Lunch*

2:00-3:05 P.M. *Presiding:* Colonel Lee B. Grant, USAF, MC

PRESENTATION OF THE SIR HENRY WELLCOME MEDAL AND PRIZE

Quality Control standards for Medical Care

Dr. C. Wesley Eisele, Associate Dean for Postgraduate Education, University of Colorado Medical Center, Denver, Colorado.

Synthetic Substitutes for Skin and Their Use in Burns—Experimental and Clinical Experiences

Dr. William M. Chardack, Chief, Surgical Service, Veterans Administration Hospital, Buffalo, New York

Determining Arctic Clothing Design by Means of Infrared Radiometry

Capt. James H. Veghte, USAF, Arctic Aeromedical Laboratory, Fort Wainwright, Alaska

3:15-4:35—*Presiding:* Brig. Gen. James E. Graham, MC, USA

Surgery Plus Chemotherapy in the Treatment of Cancer

Dr. Lynden E. Lee, Jr., Coordinator, Research in Surgery, Chief, Extra-VA Research Division, Veterans Administration, Washington, D.C.

Unusual Causes of Massive Gastrointestinal Hemorrhage

Lt. Col. Evan W. Schear, USAF, MC; USAF Hospital, Wright-Patterson, Wright-Patterson AFB, Dayton, Ohio

Essential Teamwork by Various Agencies in the National Blood Program

Dr. Frank W. Hartman, Medical Research Advisor, Aerospace Medicine Division, Directorate of Professional Serv-

ices, office of the Surgeon General, USAF, Washington, D.C.

Disaster Training

Col. Thomas A. Collins, USAF, MC, Headquarters USAF, Office of the Surgeon General, Washington, D.C.

TUESDAY, NOVEMBER 7

9:00-10.00 A.M. *Presiding:* Thomas J. Kennedy, Jr., Med. Dir., USPHS

PRESENTATION OF THE GORGAS MEDAL

From Gene to Molecular Disease—The Emerging Concept

Donald S. Frederickson, Med. Dir., USPHS, National Heart Institute, National Institutes of Health, Bethesda, Md.

Genes and Geography

Baruch S. Blumberg, Sen. Surg., USPHS, National Institute of Arthritis and Metabolic Diseases, National Institutes of Health, Bethesda, Md.

From Gene to Molecular Disease—Outstanding Examples of Inborn Errors in Metabolism of Aromatic Amino Acids

Bert N. La Du, Med. Dir., USPHS, National Institute of Arthritis and Metabolic Diseases, National Institutes of Health, Bethesda, Maryland

10:00 A.M.—*The Sustaining Membership Lecture*

Dr. Vannevar Bush, Massachusetts Institute of Technology, Cambridge, Mass.

11:00 A.M.—*Ceremony to Honor the International Delegates*

12:30 P.M.—*The International Luncheon*

2:00-4:30 P.M.—*Presiding:* John J. Blasco, M.D., Veterans Administration, Central Office, Washington, D.C.

PRESENTATION OF THE MAJOR LOUIS LIVINGSTON SEAMAN PRIZE

The William S. Porter Lecture—*Psychiatric Aspects of Prisoner of War Confinement*

Capt. John E. Nardini, MC, USN, (Ret.)

Some Sociological Considerations in the Planning of Foreign Medical Assistance Programs

CDR. Edgar M. Neptune, Jr., MC, USN, Naval Medical Research Institute, Bethesda, Md.

Medical Education and Research in the U.S.S.R.

Col. Joe M. Blumberg, MC, USA, Deputy Director, Armed Forces Institute of Pathology, Washington, D.C.

Military Preventive Medicine as a Framework for Learning Through Liaison

Maj. Henry C. Moritz, USAF, MC; 3973rd USAF Hospital (SAC), Torrejon Air Force Base, Spain

The Concurrent Weekly Administration of Chloroquine and Primaquine for the Prevention of Korean Vivax Malaria—A Preliminary Report of a Field Trial Conducted by the Eighth United States Army

Lt. Col. Stefano Vivona, MC, USA; Walter Reed Army Institute of Research, Washington, D.C.,

Dr. George J. Brewer, University of Chicago, Chicago, Ill.,

Capt. Marcel Conrad, MC, USA; 121st Evacuation Hospital, Korea; and

Dr. Alf S. Alving, University of Chicago, Chicago, Ill.

WEDNESDAY, NOVEMBER 8

9:00-10:25 A.M.—*Presiding:* Brig. Gen. Robert E. Blount, MC, USA

PRESENTATION OF THE STITT AWARD

Contributions of the Armed Forces Epidemiological Board of International Medicine

Gustave J. Dammin, M.D., President, Armed Forces Epidemiological Board, Harvard Medical School, Boston, Mass.

The Military Significance of Infectious Disease

Col. Dan Crozier, MC, USA; U. S. Army Medical Unit, Fort Detrick, Frederick, Md.

Current Perspective on the Control of Infections in Hospitals

D. H. Starkey, M.D., Queen Mary Veterans Hospital, Montreal, Canada

Report on Investigations of Shipboard Tuberculosis Among Naval Personnel

LCdr Charles H. Miller, MC, USN; Preventive Medicine Division, Bureau of Medicine and Surgery, Department of the Navy, Washington, D.C.

10:00 A.M.-12:00 NOON—*Presiding:* Col. Conn L. Milburn, Jr., MC, USA

Middle America Research Unit—An Interservice Laboratory Devoted to Medical Research in the American Tropics

Alexis Shelokov, Med. Dir., USPHS; National Institute of Allergy and Infectious Diseases, National Institutes of Health, Bethesda, Md., and

Henry K. Beye, Med. Dir., USPHS, Director, Middle, America Research Unit, Canal Zone, Panama

Recent Developments and Problems in Operation of the United States Naval Medical Research Unit No. 3, Cairo, U.A.R.

Capt. John R. Seal, MC, USN, Director, Naval Medical Research Institute, National Naval Medical Center, Bethesda, Md.

Surveillance of Hepatitis in the U.S.A.

Donald A. Henderson, Sr., Surg., USPHS

Current Concepts in the Treatment of Hepatitis

Capt. Bernard F. Clowdus, USAF, MC; USAF Hospital Andrews Air Force Base, Washington, D.C.;

Col. Maxwell W. Steel, USAF, MC, USAF Hospital Andrews Air Force Base, Washington, D.C.; and

Col. Herbert W. Coone, USAF, MC; Office of the Surgeon General USAF, Washington, D.C.

12:00 *Luncheon*

1:15 P.M.—***Annual Business Meeting of the Association***

Presiding: Leroy E. Burney, M.D., President

Report of Secretary

Election of Officers

Presentation of the Founder's Medal

2:00-4:30 P.M.—*Presiding:* LCdr. N. E. Rosenwinkel, MC, USN

PRESENTATION OF THE McLESTER AWARD

Closed-Chest Cardiac Massage and Closed-Chest Defibrillation

W. B. Kouwenhoven, Dr. Ing. Lecturer in Surgery, The Johns Hopkins University School of Medicine, Baltimore, Md.

Patient Data Processing and the Hospital

L. G. Christianson, M.D., Dep't., of Medicine and Surgery, Veterans Administration, Washington, D.C.

ICNND Cooperative Nutrition Projects with Twenty Countries

Dr. Arnold E. Schaefer, Secretariat ICNND, National Institutes of Health, Bethesda, Md.

ICNND: Nutritional Assessment and Results in Africa, Asia and South America

Dr. William J. Darby, Vanderbilt University School of Medicine, Nashville, Tenn.

Atherosclerosis in the Armed Forces; Should the Military Diet be Altered?

Col. Weldon J. Walker, MC, USA, Walter Reed General Hospital, Washington, D.C.; and

Lt. Col. Jacques L. Sherman, Jr., MC, USA, U. S. Army Research and Development Command, Washington, D.C.

Wednesday Evening, November 8

THE ANNUAL DINNER OF THE ASSOCIATION

Recognition of Award Winners and Their Sponsors. No awards will be presented at this dinner as they will have been presented previously.

There will be entertainment and music.

SECTION MEETINGS

MONDAY, NOVEMBER 6

NURSES SECTION

1:00-4:30 P.M.—*Presiding:* Cecilia H. Hauge, R.N., Director, Nursing Service, Veterans Administration, Washington, D.C.

PRESENTATION OF THE FEDERAL NURSING SERVICE AWARD

Panel Discussion: International Nursing—Path to World Progress

Moderator: Miss Ann Magnussen, National Director, Nursing Services, American National Red Cross, Washington, D.C.

Key Speaker: Miss Agnes Ohlson (Connecticut), Past President of the American Nurses Association and the International Council of Nurses. Presently—First Vice President of the International Council of Nurses.

Panel Members: Miss Catherine M. Kain, Nursing Advisor, Office of Public Health, International Cooperation Administration; and Miss Dorothy J. Sutherland, Program Director, International Education and Exchange Branch, Public Health Service, Department of Health, Education, and Welfare.

PHARMACY AND MEDICAL SERVICE CORPS SECTION

12:00 NOON—5:00 P.M.

Presiding: Pharm. Dir. George F. Archambault, USPHS, Chief, Pharmacy Branch, Div. of Hospitals, Pharmacy Liaison Officer to the Office of the Surgeon General, U. S. Public Health Service

Invitational Luncheon

Toastmaster: W. Paul Briggs, Secretary and Executive Director, American Foundation for Pharmaceutical Education

The Pharmaceutical Industry and Government

Austin Smith, M.D., President, Pharmaceutical Manufacturers Associaton

Afternoon Session

Presiding: Colonel Ralph Arnold, MSC, USA, Pharmacy Consultant to the Surgeon General, Office of the Surgeon General, U. S. Army, Washington, D.C.

PRESENTATION OF THE ANDREW CRAIGIE AWARD

Significant Developments in Federal Drug Controls

William H. Kessenich, M.D., Med. Dir., Bureau of Medicine, Food and Drug Administration, Dep't. of Health, Education, and Welfare, Washington, D.C.

The Status of American Pharmacy

William S. Apple, Secretary, American Pharmaceutical Association

The Individual Hospital Pharmacy Internship Accreditation Program—The Hospital Formulary Service

Joseph Oddis, Secretary, The American Society of Hospital Pharmacists

Recent Regulations of the Federal Narcotic Bureau Effecting Federal and Hospital Pharmacy Practices

Carl DiBaggio, Chief Counsel, Federal Bureau of Narcotics, Department of Treasury

Status of Pharmacy in Federal Government Service

U. S. Army—Col. Ralph R. Arnold, MSC, USA, Pharmacy Consultant to the Surgeon General, Office of the Surgeon General

U. S. Navy—Capt. Claude V. Timberlake, MSC, USN, Pharmacy Consultant to the Surgeon General, Office of the Surgeon General

Veterans Administration—Mr. Vernon Trygstad, Director, Pharmacy Service, Vet. Adm., Washington.

U. S. Air Force—Capt. Ivan Grimes, USAF, MSC, Pharmacy Consultant to the Surgeon General, Office of the Surgeon General

U. S. Public Health Service—Dr. George F. Archambault, Phar. Dir., Pharmacy Liaison Officer to Surgeon General

Annual Meeting of Section and Election of Officers

TUESDAY, NOVEMBER 7

DENTAL SECTION

9:00 A.M.-NOON

Presiding: Thomas A. McFall, D.D.S., Colonel, U. S. Army Dental Corps, Retired; Associate Professor of Oral Medicine, University of Pennsylvania School of Dentistry; Chairman, Dental Section, Association of Military Surgeons of the United States

Introductions and Opening Remarks

The Role of Federal Dental Services in International Health and Understanding

Col. Walter J. Reuter, USAF, DC, Deputy Assistant Surgeon General for Dental Services, U. S. Air Force

The Federal Dentist: His Role in Japanese Dentistry

George C. Paffenbarger, D.D.S., D.Sc. (hon.), Senior Research Associate, American Dental Association, Research Div., National Bureau of Standards, Washington, D.C.

Nutrition and Dentistry in Taiwan and Formosa

George W. Burnett, B.A., M.A., D.D.S., Ph.D., Colonel, Dental Corps, U. S. Army; Chief, Dep't., of Oral Biology, Walter Reed Army Institute of Research, Washington, D.C.

International Cooperation Administration Dental Program In Brazil

John M. Franke, B.S., M.S., D.D.S., M.P.H., Dental Director, U. S. Public Health Service, Regional Dental Consultant, PHS Region V, Chicago, Ill.

Soil Minerals and Dental Decay in New Zeeland School Children

F. L. Losee, B.S., D.D.S., M.S., F.A.C.D., Captain, Dental Corps, U. S. Navy

Business Meeting

VETERINARY SECTION

2:30-4:30 P.M.

Presiding: Preston Holden, D.V.M., *Remarks*

Brig. Gen. James A. McCallam, Chairman, Veterinary Section of the Association of Military Surgeons—U.S.

Comparative Medicine in Public Health

James H. Steele, D.V.M., Chief, Veterinary Public Health, Communicable Disease Center, U. S. Public Health Service, Atlanta, Ga.

Uveal and Retinal Lesions in the Dog and Cat

Lionel F. Rubin, D.V.M., U. S. Public Health Service Special Fellow, University of Pennsylvania School of Veterinary Medicine, Philadelphia, Pa.

Epidemiology of Leptospirosis (L. pomona) in Iowa

Richard A. Tjalma, D.V.M., Chief, Epizoology Section, Epidemiology Branch, National Cancer Institute, National Institutes of Health, Bethesda, Md.

The Problems and Implications of Animal Cancer Viruses

Robert J. Huebner, D.V.M., Chief, Laboratory of Infectious Diseases, National Institute of Allergy and Infectious Diseases, National Institutes of Health, Bethesda, Md.

MEDICAL SPECIALISTS SECTION

2:00-4:00 P.M.

Presiding: Mrs. Florence Linduff, Chief, Physical Therapy, Veterans Administration, Central Office, Washington, D.C.

The Peace Corps: The Contributions Which Can Be Made By Students In The Medical Specialties

Leo Gehrig, M.D., Medical Director, Peace Corps, Washington, D.C.

Counselling—How It Can Be Done More Effectively

Speaker to be announced

WEDNESDAY, NOVEMBER 8

SUSTAINING MEMBERSHIP SECTION

Presiding: Leonard A. Scheele, M.D., Vice President, Lambert-Warner Pharmaceutical Co., and Chairman, Sustaining Membership Section.

9:00 A.M.—*Presentation of the President and President-Elect of the Association of Military Surgeons of the U. S.*

9:15 A.M.—*Veterans Administration Policy on Drug Procurement*

Mr. James N. O'Neill, Director, Supply Management Service

Mr. Clyde Cook, Ass't., Director of Supply Management

Mr. W. W. Anderson, Chief, Operations Section Supply Service, Dep't. of Medicine and Surgery

Professional Aspects of Veterans Administration Drug Policy

Mr. Vernon O. Trystad, Director, Pharmacy Service

10:30 A.M.—*Army Medical Research—Current Programs*

Brig. Gen. James H. Forsee, MC, USA, Commander, Army Medical Research Command, Washington, D.C.

11:00 A.M.—*Naval Medical Research—Current Programs*

Rear Adm. Calvin B. Galloway, MC, USN Ass't., Chief for Research and Military Medical Specialties, Bureau of Medicine and Surgery, Dep't. of the Navy, Washington, D.C.

11:30 A.M.—*Air Force Medical Research in the Aerospace Age*

Col. Karl H. Houghton, USAF, MC, Special Assistant to the Surgeon General for Research, Office of Air Force Surgeon General, Washington, D.C.

12:00 NOON—*Invitational Luncheon for Sustaining Members and Their Guests, followed by Business Meeting*

PRESENTATION OF THE SUSTAINING MEMBERSHIP AWARD

TECHNICAL EXHIBITORS

Abbott Laboratories, North Chicago, Ill. (Booth 1)

American Cyanamid Company, Danbury, Conn. (Booth 22)

American Hospital Supply Corp., Evanston, Ill. (Booth 32)

American Sterilizer Company, Erie, Pa. (Booth 40)

Ames Company, Inc., Elkhart, Ind. (Booth 56)

Astra Pharmaceutical Products, Inc., Worcester, Mass. (Booth 6)

Ayerst Laboratories, New York, N.Y. (Booth 53)

Baxter Laboratories, Inc., Morton Grove, Ill. (Booth 42)

Becton, Dickinson & Company, Rutherford, N.J. (Booth 25)

Benton Laboratories, Inc., Hatboro, Pa. (Booth 16)

Charles Bruning Co., Inc., Washington, D.C. (Booth 15)

Burroughs Wellcome & Co. (USA) Inc., Tuckahoe, N.Y. (Booth 50)

Chesebrough-Pond's Inc., New York, N.Y. (Booth 35)

Chilean Iodine Educational Bureau, Inc., New York, N.Y. (Booth 13)

Ciba Pharmaceutical Products Inc., Summit, N.J. (Booth 43)

The Coca-Cola Company, Atlanta, Ga. (Special Area)

Cutter Laboratories, Berkeley, Calif. (Booth 14)

Desitin Chemical Company, Providence, R.I. (Booth 27)

Doho Chemical Corporation, New York, N.Y.
(Booth 24)

Eaton Laboratories, Norwich, N.Y.
(Booth 21)

Fenwal Laboratories, Morton Grove, Ill.
(Booth 23)

E. Fougera & Company, Inc., Hicksville, N.Y.
(Booth 31)

Geigy Pharmaceuticals, Yonkers, N.Y.
(Booth 41)

Hollister, Inc., Chicago, Ill.
(Booth 17)

Industrial Acoustics Company, Inc., New York, N.Y.
(Booth 54)

Lederle Laboratories, Pearl River, N.Y.
(Booth 57)

Eli Lilly and Company, Indianapolis, Ind.
(Booth 29)

Lloyd Brothers, Inc., Cincinnati, Ohio.
(Booth 46)

McNeil Laboratories, Inc., Fort Washington, Pa.
(Booth 37)

Mead Johnson Laboratories, Evansville, Ind.
(Booth 18)

Merck Sharp & Dohme, West Point, Pa.
(Booths 58 & 59)

The Wm. S. Merrell Company, Cincinnati, Ohio.
(Booth 45)

Orthopedic Equipment Co., Bourbon, Ind.
(Booths 19 & 20)

Parke, Davis & Company, Detroit, Mich.
(Booth 3)

Pfizer Laboratories, New York, N.Y.
(Booth 47)

Picker X-Ray Corporation, Arlington, Va.
(Booth 52)

The Purdue Frederick Company, New York, N.Y.
(Booth 48)

Reynolds Tobacco Co., Winston-Salem, N.C.
(Booth 9)

A. H. Robins Company, Inc., Richmond, Va.
(Booth 5)

Roche Laboratories, Nutley, N.J.
(Booth 61)

J. B. Roerig and Co., New York, N.Y.
(Booth 33)

Sandoz Pharmaceuticals, Hanover, N.J.
(Booth 34)

Schering Corporation, Union, N.J.
(Booth 36)

G. D. Searle & Co., Chicago, Ill.
(Booth 26)

Shampaine Industries, St. Louis, Mo.
(Booth 51)

Sierra Engineering Co., Sierra Madre, Calif.
(Booth 12)

Smith Kline & French Laboratories, Philadelphia, Pa.
(Booth 49)

Stephenson Corporation, Red Bank, N.J.
(Booth 62)

Tailby-Nason Company, Inc., New York, N.Y.
(Booth 60)

Telemedics Inc., Southampton, Pa.
(Booth 10)

The Upjohn Company, Kalamazoo, Mich.
(Booth 38)

Wampole Laboratories, Stamford, Conn.
(Booth 30)

Warner-Chilcott Laboratories, Morris Plains, N.J.
(Booth 44)

The Warren-Teed Products Co., Columbus, Ohio.
(Booth 2)

Westwood Pharmaceuticals, Buffalo, N.Y.
(Booth 4)

Wilmot Castle Company, Rochester, N.Y.
(Booth 7)

Winthrop Laboratories, New York, N.Y.
(Booth 28)

Wyeth Laboratories, Philadelphia, Pa.
(Booth 39)

SCHEDULE OF EVENTS FOR LADIES

(Reservations must be made for all events)

SUNDAY, NOVEMBER 5

1:00-5:00 P.M.—REGISTRATION AT MAYFLOWER HOTEL

MONDAY, NOVEMBER 6

9:00 A.M.-2:30 P.M.—REGISTRATION AT MAYFLOWER HOTEL

1:00 P.M.—Bus will leave for tour of Islamic Center, Naval Observatory, and Mexican Embassy

TUESDAY, NOVEMBER 7

12:00 NOON—Ladies Luncheon at the Sheraton Park Hotel, Washington. Reception for Honored Guests. Favors and Door Prizes. Fashion Show: "Pearls of Fashion"—Julius Garfinckel Co., Washington, D.C.

WEDNESDAY, NOVEMBER 8

9:00 A.M.—TOUR OF MOUNT VERNON

NOON—Luncheon at Old Club, Alexandria, Va.

1:30 P.M.—Tour of National Institutes of Health Clinical Center, Bethesda, Md.

COMMITTEES FOR THE 68TH ANNUAL MEETING

(Chairmen Only Named)

General Chairman
MED. DIR. JAMES K. SHAFER, USPHS

Assistant to General Chairman
MED. DIR. HOWARD FISHBURN, USPHS

Scientific Exhibits
MR. HERMAN VAN COTT

Technical Exhibits
MR. STEVEN K. HERLITZ

Registration and Reception
PHARM. DIR. MILTON W. SKOLAUT, USPHS

Dinners and Luncheons
CAPT. EDITH A. JONES, USPHS

Ceremonies and Entertainment
MED. DIR. LEO J. GEHRIG, USPHS

International Committee
ASST. SURG. GEN. JAMES M. HUNDLEY, USPHS

Reserve Officers Affairs
CAPTAIN DONALD J. O'BRIEN, MC, USN

Scientific Program
THOMAS J. KENNEDY, JR., M.D.

Publicity
MR. IRVING GOLDBERG, USPHS

Professional Activities
CAPT. WILLIAM L. ROSS, USPHS

Transportation
MAJOR DANE M. SMITH, TC, USA

Sustaining Membership
LEONARD A. SCHEELE, M.D.

Ladies Activities
MRS. JAMES V. LOWRY

NEW BOOKS

Preventive Medicine in World War II. Vol. 5. *Communicable Diseases Transmitted Through Contact or By Unknown Means.* Prepared and published under the direction of Lieutenant General Leonard D. Heaton, The Surgeon General, United States Army. Editor-in-Chief: Col. John Boyd Coates, Jr., MC. Twenty-seven contributors. With Foreword by Ebbe Curtis Hoff, Ph.D., M.D. 530 pp., illustrated. U.S. Government Printing Office, Washington, D.C. Price $5.75.

Ciba Foundation Symposium. *The Nature of Sleep.* Editors: G. E. W. Wolstenholme, O.B.E., M.S., M.B., M.R.C.P. and Maeve O'Connor, B.A. 416 pp., 101 illustrations. Little, Brown & Company, Boston. Price $10.00.

The Putnam Medical Dictionary. By Norman Burke Taylor, V.D., M.D., F.R.S. (Canada), F.R.C.S. (Edinburgh), F.R.C.P. (Canada), M.R.C.S. (England), L.R.C.P. (London), and Allen Ellsworth Taylor, D.S.O., M.A. With the assistance of Ann D. A. Taylor, B.A. 933 pp., illustrated. G. P. Putnam's Sons, New York. Price $4.95.

Mayo Clinic Diet Manual. 3rd Edition. By The Committee on Dietetics of The Mayo Clinic. 222 pp. W. B. Saunders Company, Philadelphia, London, Price $5.50.

Index-Catalogue "The Surgeon General"—5th Series, and last. (Three volumes 2 volumes completed). U.S. Government Printing Office, Washington. Price $17.25 for set.

Oral Exfoliative Cytology. Interim Report of Veterans Administration Cooperative Study. Transactions of Conference on Oral Exfoliative Cytology, November 4, 1960. With Foreword by John E. Fauber, D.D.S. 74 pp., illustrated. U.S. Government Printing Office, Washington. Price $1.50.

Poliomyelitis. Papers and Discussions Presented at the Fifth International Poliomyelitis Conference, Copenhagen, Denmark, July 26-28, 1960. Compiled and Edited for the International Poliomyelitis Congress. With Dedication by Basil O'Connor, and Preface by Morris Fishbein, M.D. 435 pp., illustrated. J. B. Lippincott Company, Philadelphia, Montreal. Price $7.50.

Thoracic Diseases. Emphasizing Cardiopulmonary Relationships. By Eli H. Rubin, M.D., F.A.C.P., F.C.C.P., and Morris Rubin, M.D., F.A.C.S., F.C.C.P. In Association with George C. Leiner, M.D., F.A.C.P., F.A.C.C., and Doris J. W. Escher, M.D. 968 pp., illustrated. W. B. Saunders Company, Philadelphia, London. Price $25.00.

The Shaking Palsy. From the Symposium on Parkinson's disease, Montreal, Canada, October 1959; under the auspices of the U.S. Veterans Administration and the Department of Veterans Affairs of Canada. Editors: Blaine Nashold, M.D., and Harold Elliott, M.D. McGill University Press, Montreal. Price $5.00.

Whillis's *Elementary Anatomy and Physiology.* 5th Ed. By Roger Warwick, B.Sc., Ph.D., M.D. 275 pp., 107 illustrations. Little, Brown and Company, Boston, U.S. distributors. Price $7.00.

Handbook on Clinical Electromyography. By Robert B. Pearson, M.D. 72 pp., Illustrated. The Meditron Company, Div. of Crescent Engineering & Research Co., El Monte, Calif. Price not stated.

Scientific Aspects of Neurology. Leeds Neurological Sciences Colloquium, 1959-1960. Edited by Hugh Garland, T.D., M.D., F.R.C.P., with 20 contributors. 264 pp., illustrated. The Williams & Wilkins Company, Baltimore. Price $9.75.

Ciba Foundation Study Group No. 8. *Problems of Pulmonary Circulation.* Editors: A. V. S. de Reuck, M.Sc., D.I.C., A.R.C.S., and Maeve O'Connor, B.A. 96 pp., 21 illustrations. Little, Brown and Company, Boston. Price $2.50.

The Cry for Help. Edited by Norman L. Farberow, Ph.D., and Edwin S. Shneidman, Ph.D. With Foreword by Robert H. Felix, M.D. 398 pp. McGraw-Hill Book Company, Inc., New York, Toronto, London. Price $9.95.

Basic Essentials of Blood Group Theory and Practice. By Kathleen E. Boorman and Barbara E. Dodd. 133 pp., illustrated. Little, Brown and Company, Boston. Price $4.50.

The Newborn Child. By David G. Vulliamy, M.D., M.R.C.P., D.C.H. 163 pp., illustrated. Little, Brown and Company, Boston. Price $6.00.

A Mirror Up To Medicine. By A. C. Corcoran, M.D. With Preface by Allan Nevins. 506 pp. J. B. Lippincott Company, Philadelphia, New York, Montreal. Price $5.75.

Basic Biochemistry. By M. W. Neil, Ph.D. With Foreword by F. L. Warren. 360 pp., illustrated. J. B. Lippincott Company, Philadelphia, Montreal. Price $6.75.

Medical Examination Review Books, Vol. 8. *Psychiatry and Neurology.* Twelve-hundred questions and answers. Medical Examination Publishing Co., Inc., Flushing, N.Y. Price $6.00.

BOOK REVIEWS

CARDIO-VASCULAR SURGERY. A Manual for Nurses. By Members of the Surgical Staff and Members of the Nursing Service Staff. The Methodist Hospital, Texas Medical Center. Edited by George H. Peddie, M.D., and Frances E. Brush, R.N. 170 pp., illust. G. P. Putnam's Sons, New York. Price $2.75.

This manual appears to be a sequel to the original manual published by the Methodist Hospital on this same topic in 1958. The format of the current manual has been improved and the illustrations appropriately placed in relation to the textual material.

The logical sequence and sound discussion of the normal anatomy, physiology, pathology, diagnostic tests, pre-operative care, anesthesia and operative procedures, and post-operative care presents a general overall picture of continuity of care for the cardio-vascular patient. A limited number of specific techniques used at the Methodist Hospital are described, however, the procedures are general enough in character that the techniques could be adapted to a local situation.

This comprehensive, readable manual should serve as an excellent text book for students of nursing and as a reference for graduate nurses in cardio-vascular nursing particularly in post-operative care.

The appendix briefly discusses special drugs and one type of pump oxygenator; tracheostomy care and thoracic and gastrointestinal drainage are discussed in detail. The glossary and bibliography are excellent.

MAJ. SADYE T. TRAVERS, ANC, USA

SYMPTOM DIAGNOSIS. 5th Ed. By Wallace Mason Yater, A.B., M.D., M.S. (Med.), F.A.C.P., and William Francis Oliver, B.S., M.D., F.A.C.P. 1035 pp. Appleton-Century-Crofts, Inc., New York. Price $15.00.

The purpose of this book as stated by the authors is three fold: "(1) to aid the busy physician in the diagnosis of his case by allowing him to quickly reduce the number of possibilities to a relatively small list; (2) to prevent the oversight of important considerations; and (3) to make the medical man more observant of the characteristics of the symptoms of disease."

The authors also state that the book should be kept on the desk where it is immediately available. While the patient is gotten ready for examination the physician can make a quick check of the presenting symptoms. Toward that end the book is divided into sections entitled "Regional Symptoms." Here one can quickly find the section desired and then, turning to it, can locate the paragraph pertaining to the condition under consideration. This is easy since the symptom or disease is in bold type at the beginning of the paragraph. Following this are the words of wisdom collected over the years of experience by the authors.

There are two appendices: 1. Syndromes; 2. Diseases, Symptoms, and Signs Associated with Men's Names. There is, of course, an index which is useful as a back-up for locating information in the book.

All physicians, general or specialists, would find this a very helpful book.

R.E.B.

DISEASE AND INJURY. Edited by Leopold Brahdy, M.D., with 25 eminent contributors. 482 pp. J. B. Lippincott Company, Philadelphia and Montreal. Price $12.50.

This is a book that should be owned and consulted frequently by every physician and surgeon who has occasion to appear in court on any matters pertaining to accident or injury.

It gives a concise authoritative opinion on the question of injury as an etiological factor in many kinds of disease and also brings out how an existing disease may be aggravated by trauma. Many superstitions and old wive's tales which have accumulated through the years both by word of mouth and in the literature are debunked in such a way that they should be relegated to oblivion. There are many able contributors who are well versed in their fields and who are able to speak with authority.

Impressive are the chapters on pregnancy, tumors, mental disease and diseases of the bone, especially of the spine. The value of graded exercise in certain cardiac cases and the importance of avoidance of trauma in the diabetic are emphasized. "Knowledge of the role of injury to disease is a necessary part of medicine."

Attorneys representing clients with accident or injury will also find this a valuable addition to their libraries.

Aside from its medico-legal value the physician will discover many gems of wisdom in its pages which he can use to his advantage and that of his patient. It is interesting enough to read from cover to cover and also as a quick ready reference book.

The extensive bibliography at the end of each chapter is a distinct asset to those who wish to pursue any subject in more detail.

CAPT. LAWRENCE L. BEAN, MC, USN, Ret.

A MANUAL OF CUTANEOUS MEDICINE. By Donald M. Pillsbury, M.D., D.Sc. (Hon.), F.A.C.P.; Walter B. Shelley, M.D., Ph.D., F.A.C.P.; and Albert M. Kligman, M.D., Ph.D., 430 pp., illust. W. B. Saunders Company, Philadelphia and London. Price $9.50.

In 1956 the authors produced an excellent larger text (Dermatology, W. B. Saunders Company). They have utilized much of the graphic material from their major work in illustrating this manual. The writing of the "condensation-type" text is undoubtedly more difficult; however, the authors are effectively successful in this venture. They have discussed the skin as "a multicellular and multiorgan system," thereby giving the non-dermatologically trained reader a more comprehensive insight into the concept of "cutaneous medicine."

The initial chapters of the text discuss the anatomic, physiologic and chemical factors in the diseases of the skin. The major portion of the writing, however, deals with clinical dermatology and therapy. There is a 14-page Formulary at the end of the text. The writers are highly respected for their conservative and practical approach to dermatological therapy. This was evident in their major text in 1956, and is also reflected in this recommended new manual.

LT. WILLIAM M. NARVA, MC, USN

RECENT ADVANCES IN TROPICAL MEDICINE. 3rd Ed. By Sir Neil Hamilton Fairley, K.B.E., M.D., D.Sc., F.R.C.P., F.R.A.C.P., D.T.M. & H.; A. W. Woodruff, M.D., Ph.D., F.R.C.P., D.T.M. & H.; and J. H. Walters, M.D., F.R.C.P., Lt. Col. I.M.S. (Ret.) 480 pp., 15 illust. Distributed in the United States and Possessions by Little, Brown and Company, Boston. Price $11.00.

This carefully indexed volume of 480 pages, nicely covers the great advances made in Tropical Medicine since World War II. The two earlier editions were written by Sir Leonard Rogers. Each subject included is covered comprehensively, including etiology, epidemiology, pathology, clinical features, diagnosis, and therapy. A fine bibliography is included. The book is accurate and authoritative, although no mention could be found of the theoretical importance of glucose-6-phosphate dehydrogenase deficiency of erythrocytes in relationship to the distribution of estivo-autumnal malaria in Africa.

BRIG. GEN. ROBERT E. BLOUNT, MC, USA

THE AMERICAN ACADEMY OF ORTHOPAEDIC SURGEONS. Instructional Course Lectures. Vol. 17. Edited by Fred C. Reynolds, M.D., 420 pp., 358 figs. The C. V. Mosby Company, St. Louis. Price $18.50.

This new volume follows the pattern of its predecessors. Five categories of subjects are selected from the 1960 Instructional Course Program of the American Academy of Orthopaedic Surgeons. Part I concerns Fractures and the lead article is a résumé of "Fractures of the Elbow in Children" by Dr. John Fahey. Next are two articles on associated vascular injuries by Drs. Stein and Stokes. Finally, this section is concluded with a "Symposium on the Management of Fresh Fractures of the Neck of the Femur." Some variations of opinion are noted between the authors, but these are not basic differences. One wonders why subtrochanteric osteotomy is not employed as a primary operative treatment of intracapsular fractures of the femur, and especially in those physiologically able to tolerate some immobilization.

Part II—on Bone Graft Surgery—is an interesting review by such well known workers as Drs. Hyatt, Herndon, Boyd, and Urist. Little new is presented. The role of immunity responses and of the superiority of the autograft are reemphasized. Dr. Urist's opening paragraph was both amusing and awesome in that he predicted an increase from 280 articles on materials used in bone surgery to 187,500 articles in the last decade of this century at the present rate of publications. It is hoped that computer systems will be working to screen these articles by the year 2000.

Part III—on Children's Orthopaedics—consists of three excellent articles. Two are related to leg length discrepancy. Dr. William T. Green discusses with Miss Anderson "Skeletal age and the Control of Bone Growth." Dr. Blount's paper on "Unequal Leg Length" brought out the secondary inequalities of leg length as related to obliquity of the pelvis, intrinsic hip deformity, intrinsic knee deformity, and foot deformities, comparing these with the actual discrepancies in leg length. These secondary causes are often neglected in this sort of discussion. Drs. Aitken and Frantz wrote a most authoritative article on the "Management of the Child Amputee."

Part IV—labelled Miscellaneous—included Drs. Robinson and Southwick's "Surgical Approaches to the Cervical Spine" with the "Symposium on Disability Evaluation" conducted by Dr. Charles J. Frankel. Part V—on Athletic Injuries—saw Dr. Don O'Donaghue serving as the moderator. This section manifests the trend toward more emphasis on athletic injuries.

In conclusion, this volume is well-written, well-edited, well-illustrated, and well-printed. It is recommended to those who treat trauma as well as to all orthopaedists.

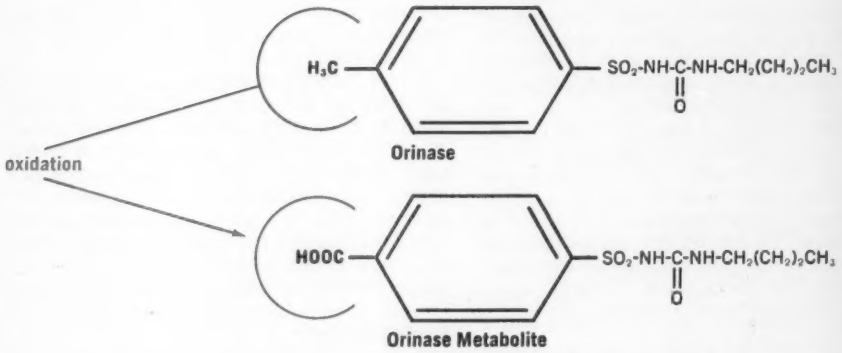
CAPT. ROBERT H. BROWN, MC, USN

Why is the methyl "governor" in Orinase so important?

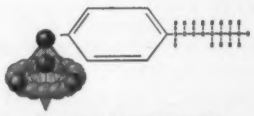
One of the most significant advantages of Orinase therapy is the rarity of associated hypoglycemic reactions.

This widely-reported clinical benefit is a function of the exclusive Orinase methyl "governor." Lending itself to ready oxidation (principally, it is thought, a hepatic process), the methyl group ensures prompt metabolic inactivation of the Orinase molecule. What actually happens is that a rapidly- and continuously-excreted carboxy-metabolite is produced that has no hypoglycemic activity at the existing levels.

As a result of the oxidation of its methyl group, Orinase shows a decline in activity soon after it reaches its effective peak in the plasma. Maintenance dosage serves to reduce blood sugar levels to normal, but rarely below that point, and there is no reported problem of accumulation.



Orinase*



An exclusive methyl "governor" minimizes hypoglycemia

Indications and effects: The clinical indication for Orinase is stable diabetes mellitus. Its use brings about the lowering of blood sugar; glycosuria diminishes, and such symptoms as pruritus, polyuria, and polyphagia disappear.

Dosage: There is no fixed regimen for initiating Orinase therapy. A simple and effective method is as follows: *First day*—6 tablets; *second day*—4 tablets; *third day*—2 tablets. The daily dose is then adjusted—raised, lowered or maintained at the two-tablet level, whichever is necessary to maintain optimum control.

Patients receiving insulin (less than 20 units)—discontinue insulin and institute Orinase; (20 to 40 units)—initiate Orinase with a concurrent 30 to 50% reduction in insulin dose with a further careful reduction as response to Orinase is observed; (more than 40 units)—reduce insulin by 20% and initiate Orinase with a further careful reduction in insulin dosage as response to Orinase is observed. In candidates for combined Orinase-insulin therapy, an individualized schedule is usually obtainable during a trial course of two or more weeks.

Contraindications and side effects: Orinase is contraindicated in patients having juvenile or growth-onset, unstable or brittle types of diabetes mellitus; history of diabetic coma, fever, severe trauma or gangrene.

Side effects are mild, transient and limited to approximately 3% of patients. Hypoglycemia and toxic reactions are extremely rare. Hypoglycemia is most likely to occur during the period of transition from insulin to Orinase. Other untoward reactions to Orinase are usually not of a serious nature and consist principally of gastrointestinal disturbances, headache, and variable allergic skin manifestations. The gastrointestinal disturbances (nausea, epigastric fullness, heartburn) and headache appear to be related to the size of the dose, and they frequently disappear when dosage is reduced to maintenance levels or the total daily dose is administered in divided portions after meals. The allergic skin manifestations (pruritus, erythema, and urticarial, morbilliform, or maculopapular eruptions) are transient reactions, which frequently disappear with continued drug administration. However, if the skin reactions persist, Orinase should be discontinued.

Clinical toxicity: Orinase appears to be remarkably free from gross clinical toxicity on the basis of experience accumulated during more than four years of clinical use. Crystalluria or other untoward effects on renal function have not been observed. Long-term studies of hepatic function in humans and experience in over 650,000 diabetics have shown Orinase to be remarkably free of hepatic toxicity. There has been reported only one case of cholestatic jaundice related to Orinase administration, which occurred in a patient with pre-existing liver disease and which rapidly reversed upon discontinuance of the drug.

Each tablet contains:
Tolbutamide ..... 0.5 Gm.

Supplied: In bottles of 50.

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June, 1961

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